

THE IRON AGE

A Review of the Hardware, Iron, Machine, and Metal Trades.

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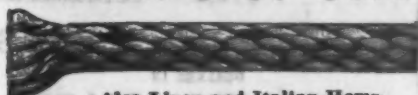
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THE IRON AGE

THURSDAY, DECEMBER 8, 1904.

The Scottdale Corliss Engine.

A new branch of manufacture for the Scottdale Foundry & Machine Company, Scottdale, Pa., is the building of Corliss engines. These are of up to date design and have several novel features of construction. They are built in all combinations—simple, cross compound and tandem compound—adapting them to various classes of service. There is but one style of bed—namely, a heavy box or rolling mill pattern. The bed, main pillow block and guides are in a single casting, the metal in which is distributed in a manner to best resist the working stresses. Lubrication is one of the most important items in the design of modern engines, and has been carefully provided for in the Scottdale engines to insure smooth running qualities.

The main bed plate bears on the foundation its entire length, not only at the sides but also in the center, through

tom box babbitted and bored to fit the shaft. The ample base of this bottom box prevents springing when the weight of the shaft and wheel comes on it. Wedges fitting the whole length of the side box are used to take up the longitudinal thrust of the box. The side boxes themselves have sufficient area to stand the whole thrust of the engine under maximum load. As will be noticed in Fig. 1, a hole is cored in the forward end of the main pillow block. This is for the purpose of allowing the engineer at any time and with perfect safety to himself to feel the bottom box to determine its temperature. The main pillow block cap rests upon a separate top box. All four boxes are babbitted and so arranged as to accommodate themselves to the shaft.

The steam valves take steam on the outer edges, as this arrangement allows the best design of gearing on the wrist plate side. The valves are of a form that will not retard the flow of steam from them, and the passage is as

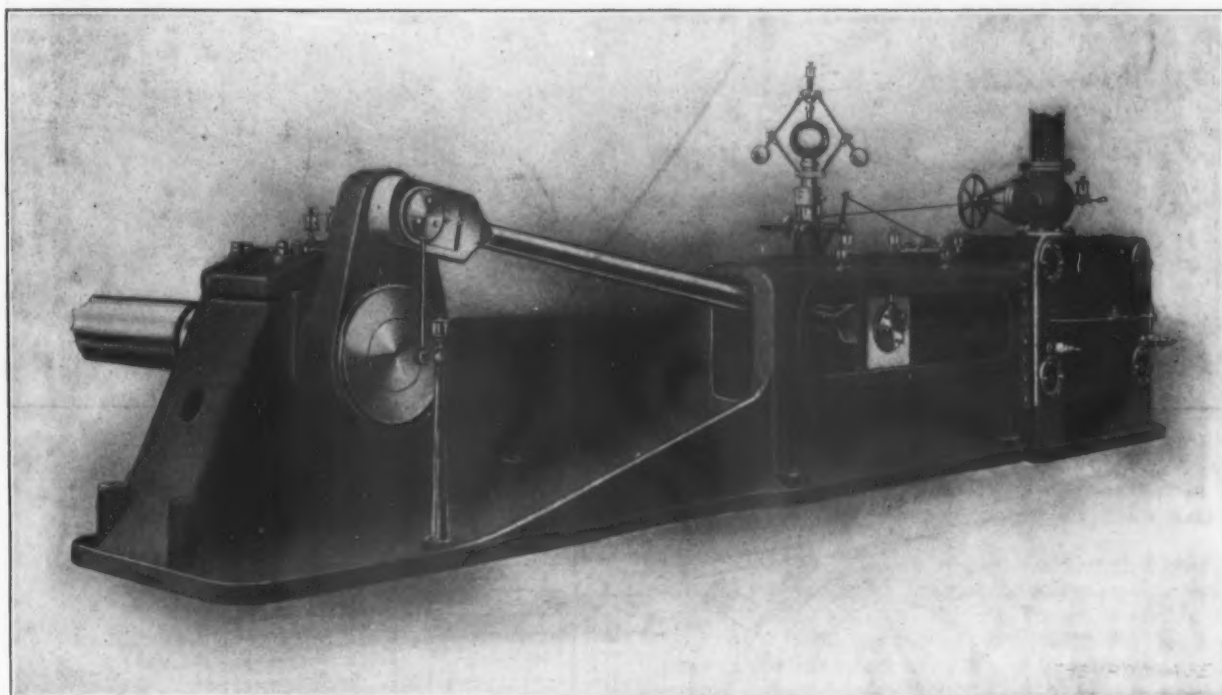


Fig. 1.—The Crank Side of the Scottdale Corliss Engine.

which runs a longitudinal web. The base is extended, and is surrounded with an oil retaining flange. The manner of fastening the cylinder to the bed is novel. It will be noticed from Figs. 1 and 2 that, instead of the usual circle of bolts and a decreased diameter on the neck of the bed in order to get flange room, this bed has been carried back in parallel lines, the end being square to meet the squared end of the cylinder. The connecting bolts are arranged in straight lines and are easy of access. The arrangement is believed to make for better alignment between the bed and the cylinder, and certainly gives a desirable broad joint. The cylinder is cast of a special mixture of close grained iron, and is thick enough to allow for two or more reborings. The exhaust steam passage is separated from the cylinder barrel by an air space. The front head carries the stuffing box and comes within the boxlike portion of the bed containing the guides, making it removable without disturbing the joint between the cylinder and bed. The usual safety relief valves are provided to pass off entrained water in the cylinders and avoid danger of breakage. The main pillow block, as has been stated, is cast solid with the bed and is fitted with an extra heavy bot-

tom box babbitted and bored to fit the shaft. The ample base of this bottom box prevents springing when the weight of the shaft and wheel comes on it. Wedges fitting the whole length of the side box are used to take up the longitudinal thrust of the box. The side boxes themselves have sufficient area to stand the whole thrust of the engine under maximum load. As will be noticed in Fig. 1, a hole is cored in the forward end of the main pillow block. This is for the purpose of allowing the engineer at any time and with perfect safety to himself to feel the bottom box to determine its temperature. The main pillow block cap rests upon a separate top box. All four boxes are babbitted and so arranged as to accommodate themselves to the shaft.

The governor shown in Fig. 4 is of the fly ball pattern, designed to run at about 60 revolutions per minute. It is claimed to keep the speed within very close limits when the load varies from nothing to the full power of the engine. The revolving collar to allow for oiling is located below the fly ball arms of the governor instead of between them, as in many governors. It is arranged to run in a recess which is filled with oil. The retarding dash box is concentric, with the governor spindle, avoid-

ing side strains and undue friction. All oil dropping from the collar ring is caught in this dash pot and may be drained away. A safety catch is provided which prevents the engine from running away in case the belt should break. This catch may be operated by the engineer from the throttle valve, or is made automatic if desired.

The dash pots, the general form of which is shown in Fig. 5, have been designed with almost as much attention to lubrication as is given to the proper proportioning of the parts of the engine itself. Probably there is no one source of trouble in dash pots more annoying than that which may be traced to faulty lubrication. This

dash pots or valve gear when the length of the dash pot rod is not properly adjusted. This is likely to happen if the engineer, when indicating the engine and changing the length of the steam connections, forgets or neglects to change the corresponding length of the dash pot rod. In addition to being a safeguard against such breakage the spring in this dash pot is also a means to the attaining of almost silent running. The arrangement of the air valves in the dash pots is clearly indicated in the figure.

The eccentrics are fastened to the shaft by direct clamping of the split halves entirely about the circumference of the shaft without depending on set screws. The

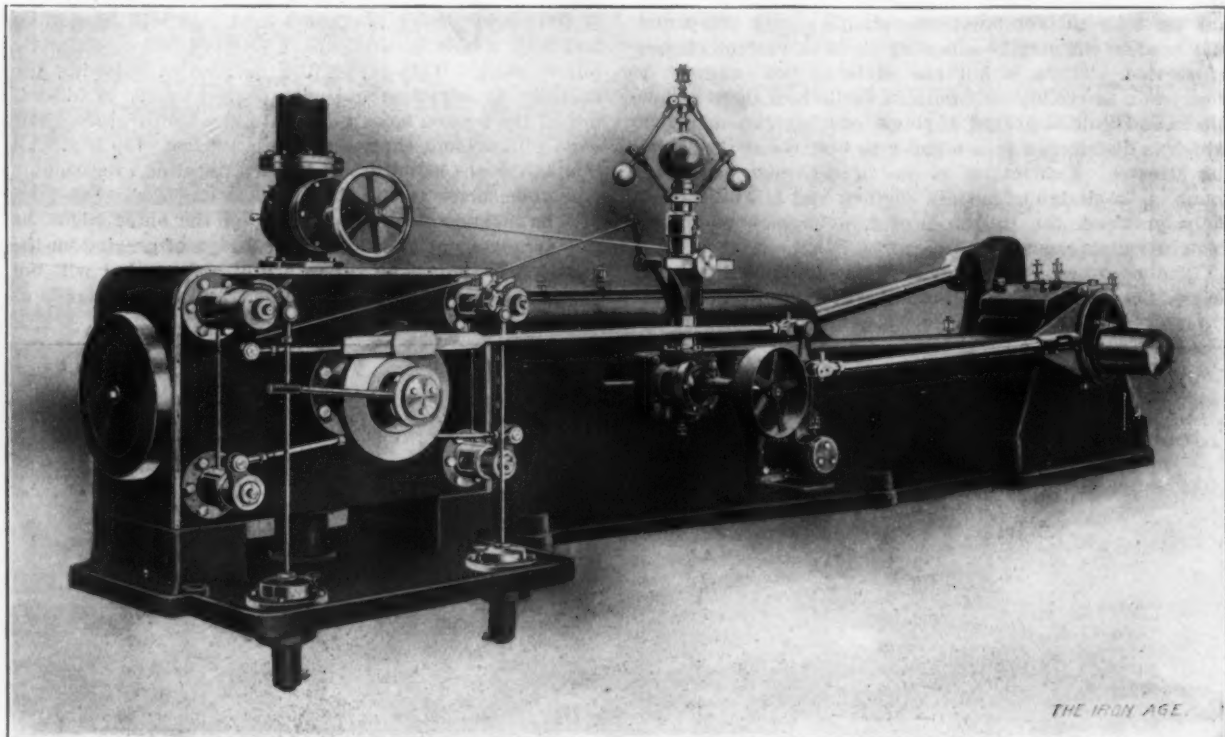


Fig. 2.—View of the Side Carrying the Valve Mechanism.

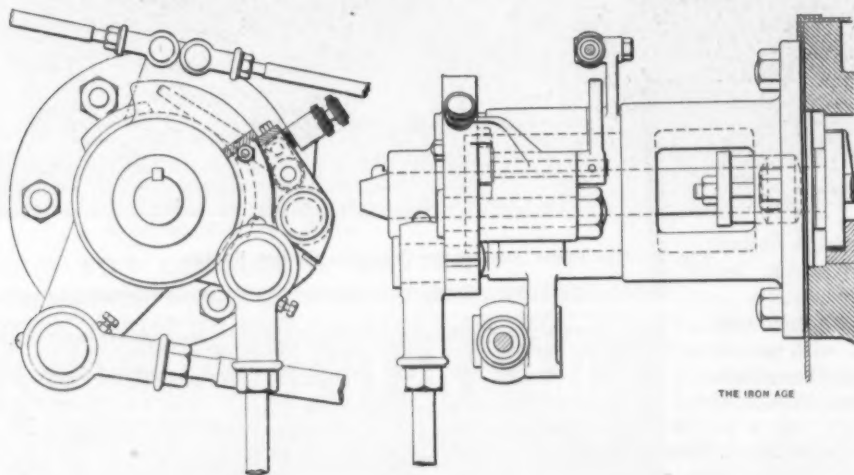


Fig. 3.—Detail of the Valve Operating Mechanism.

dash pot is placed below the base plate of the cylinder, as may be seen in Figs. 1 and 5. The plunger is closed at the upper end and turned and polished. It can easily be kept clean and no dust or dirt can collect about it. Most important of all, it is so constructed that all parts can be flooded with oil while in motion. Oil poured around the outer rim of the upper plunger will find its way from the upper end of the lower chamber, after which it will drain out of the small air valve in the bottom without damage to the pot. The dash pot is connected to the valve gear by a light rod having a ball joint on its lower end, which is kept in position by a spring, as shown. The purpose of this is to prevent breakage of

straps are of extra width and are babbitted on the wearing surfaces to insure cool and easy running. The wrist plate is a plain turned disk having the pins on the inner side. The bearing is large and of extra length, extending on either side of the plate, so that the wear is central and uniform, and all overhang avoided. This extended bearing allows the starting bar to be used in a position which is well clear of the valve gear, as shown in Fig. 2. From the same illustration it will be noticed that a feature of the rocker arm is the use of an extra heavy trunnion stud. Below this is placed a cast iron pan for catching oil drip. The eccentric hook block is of the sliding type, but so arranged that all wear is taken up

automatically. The center of the rod is in line with the center of the wrist plate pin, so that the strain is central. The wrist plate pin has adjustable brasses and adjusting screws to take up wear.

The cross head guides are cast solid on the main bed and bored in true alignment with the cylinder. A special feature of the guides is the copious lubrication obtained by circulating a large quantity of oil on the lower guide, the cross head effecting this circulation. The lower guide is in the form of a trough, flanges being provided at the ends, beyond the limits of the cross head stroke, to retain oil. As the cross head moves from end to end it crowds the lubricant ahead of it. Near each end an opening is made downward, which connects by piping with another opening leading up into the trough at a distance from the end toward the center of slightly more than the length of the cross head. Then, as the oil is crowded toward one end or the other, it drains down through one or the other of these pipe connections and in seeking its level rises at the opposite end of the cross head just before it starts on its return stroke. The upper guide and the cross head pin are lubricated from stationary sight feed oil cups, the two for the pin being provided with wipers.

The connecting rod, cross head and crank are all generally designed in keeping with what is regarded as the best accepted practice of the time. The rod is made of hammered steel and has solid ends fitted with bronze boxes, adjustable by micrometer adjustment or by keys. The cross head is heavy in its proportions, is made of

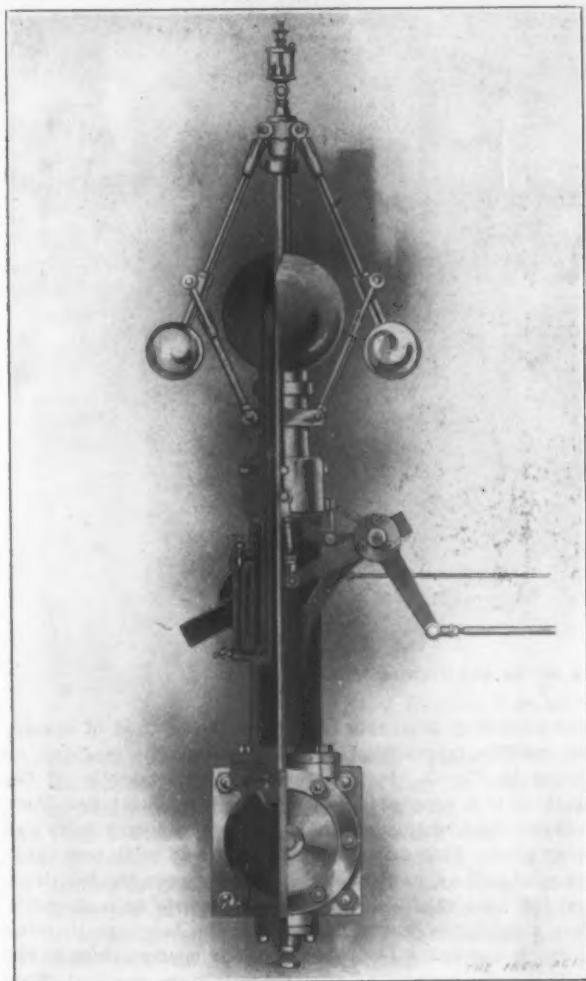


Fig. 4.—Detail of the Governor.

tough cast iron and has the cross head pin fitted in tapered holes. A large flanged head on the outer side of the cross head pin is held to the cross head with four bolts easily accessible when it is desired to remove the pin. The crank is furnished either in a heavy plain or disk pattern, made of strong, tough cast iron, and is pressed on the shaft under hydraulic pressure. In the

smaller sizes the crank has a single key and in the larger sizes two keys are used 90 degrees apart.

In addition to such special features for lubrication as have already been mentioned, it should also be added that every moving contact is supplied with a continuous stream of oil, and that every drop used is caught in a receptacle and drained to

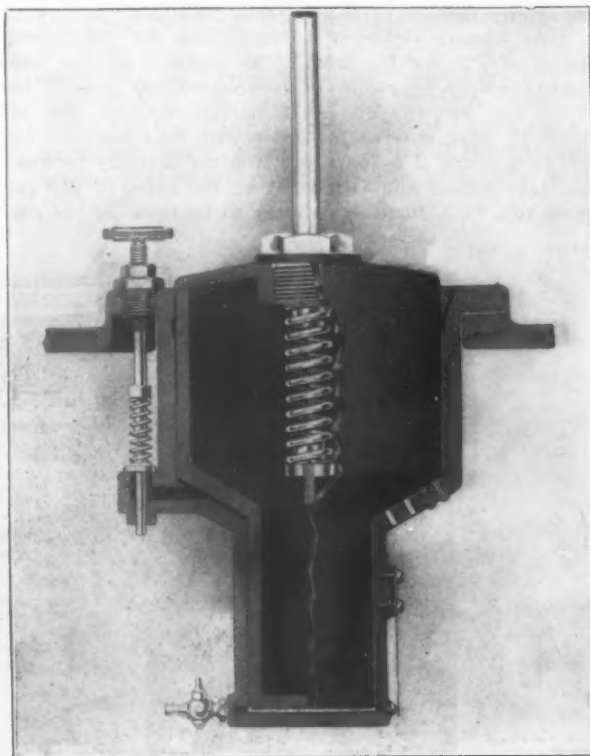


Fig. 5.—Detail Showing the Dash Pot Construction.

a basin from which it may be carried to a filter and used over again indefinitely. The manner of lubricating the cylinder is at the choice of the purchaser, although the preferred method is to use a mechanically operated pump or else supply the oil under hydrostatic pressure from a large receptacle under the floor or in some out of the way place.

The engine is made in simple heavy duty pattern, compound noncondensing heavy duty and compound condensing heavy duty types. The first ranges in size from 14 x 36 to 40 x 72 inches, the compound noncondensing engines from 10 and 15 x 30 to 32 and 50 x 60 inches and the compound condensing from 10 and 18 x 30 to 32 and 60 x 60 inches. The largest and most powerful engine is slightly over 2000 horse-power.

An Important Educational Work.

A highly important work is being carried on in trans-Mississippi States, in which professors of agricultural colleges and experiment stations, assisted and encouraged by railroads running through agricultural communities, are holding meetings for the purpose of educating farmers to the use of better and more prolific seeds and the adoption of better and more effective methods of agriculture. This work is carried on by means of special trains, which carry the instructors and their assistants, together with quantities of seed corn and wheat and other cereals. At intervals along the route this train is side tracked and meetings are held, at which the professors give the farmers who attend the benefit of their information and advice. The Chicago, Rock Island & Pacific Railroad carried on a campaign last year with a view to increasing the corn crop in the territory served by that road, and it is stated that the results are highly encouraging. This year the Chicago, Milwaukee & St. Paul is conducting similar work in South Dakota.

The Repudiation of Contracts.

We have received through the courtesy of W. H. Haslinger, vice-president of the Republic Iron & Steel Company, Birmingham, Ala., a copy of a most interesting brochure entitled "Retribution; or, Why It Pays to Carry Out Contracts." This booklet is issued by the Pioneer Mining & Mfg. Company, Birmingham, Ala., a subsidiary interest of the Republic Company.

The Pioneer Company manufactures the well-known brand of Pioneer pig iron. The contents of the book consist wholly of copies of correspondence passing between the company and an unnamed customer who on April 21, 1904, entered his order with that company for 500 tons of No. 2 foundry pig iron for delivery between the date named and October 1 at the price of \$10 per gross ton, f.o.b. furnace, delivery to be made as the cus-

it. The company answered this by calling his attention to the fact that his contract had expired by limitation, the completion of it being due by October 1.

An effort was then made by the customer in most seductive terms to endeavor to hold the company to its contract. To this the company replied calling his attention to the fact that No. 2 foundry was then being sold on the basis of \$12 per ton for delivery over the balance of the year. No comments are made, the inference being left to the reader of the book.

The Colburn 53-Inch Boring and Turning Mill.

There are a number of new features in the new boring and turning mill recently brought out by the Colburn Machine Tool Company, Franklin, Pa., which will be appreciated by those familiar with this line of machinery.

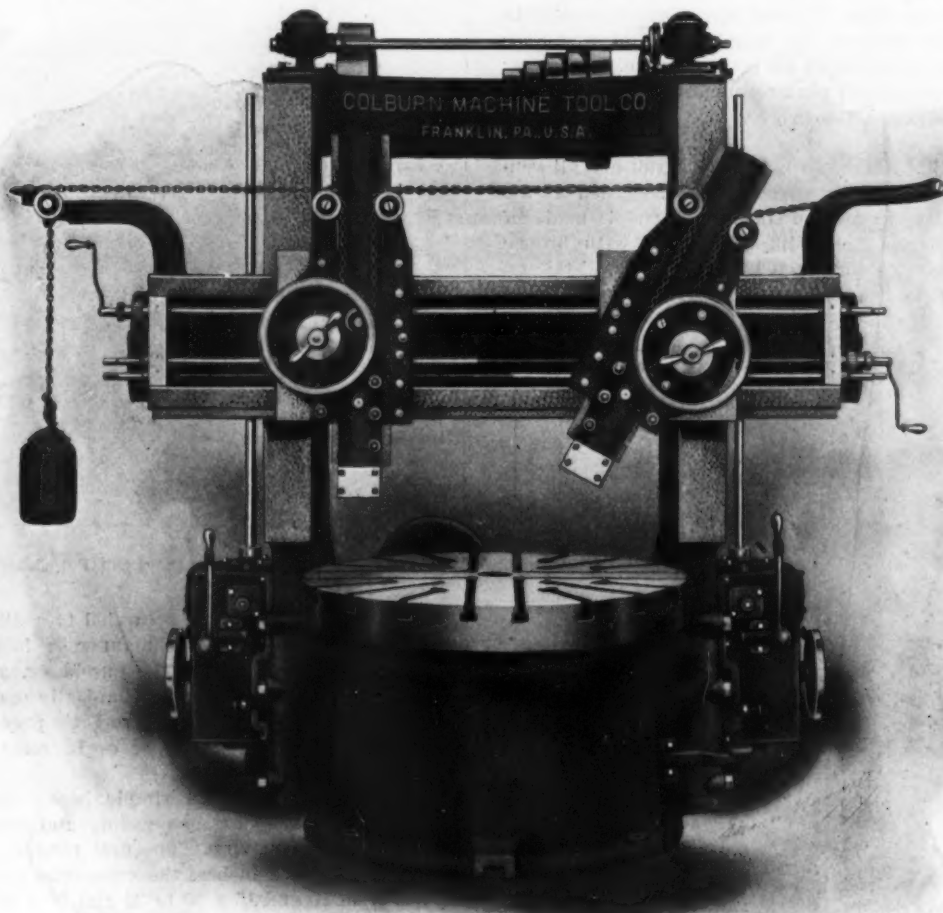


Fig. 1.—Front View of the Colburn Boring and Turning Mill.

tomers' requirements might demand within the time specified.

According to the correspondence, the customer in May called the attention of the company to the fact that pig iron had gone off 50 cents. In June he asked the company to ship him one car of No. 2 foundry at \$9.25 per ton. When the company called his attention to his contract he replied that it was "nixie." Some quite spicy correspondence followed this claim, but nothing conclusive resulted.

In September the same customer asked the company if it would take an order for 200 or 300 tons of No. 2 foundry at \$9 and No. 4 foundry at \$8.50 for immediate delivery. The company replied that it could not quote as it was sold up and would be out of the market for at least 60 or 90 days.

On October 12 the customer requested a quotation for prompt shipment on 200 tons of No. 2 foundry, to which the company replied that it was sold up for the balance of the year on the grade mentioned. On October 18 he wrote referring to his contract of April 21, and requested prompt shipment of two cars of No. 2 foundry to apply on

One especially desirable feature is the method of mounting the driving mechanism at the rear of the machine, as shown in Fig. 2. It is assembled independently of the machine in a separate head stock, which is set low down between the housings and held in place by heavy bolts and taper pins. This arrangement does away with overhanging cone pulleys, as they are carried between the housings, and the cone shafts have bearing supports on both sides, thus eliminating any tendency for the bearings to wear more on one side. Considerable floor space is also saved by this arrangement, as everything is more compact. This style of main drive can be easily adapted for electric motor drive, the motor being placed on suitable brackets between the housings. In place of belt drive silent chain or direct gear can be used with either a constant or variable speed motor. The feeds are positive, being gear driven, and there are ten changes, ranging from 0.025 to 0.500 inch horizontally, and from 0.020 to 0.400 inch in vertical or angular directions. The feeds are changed by turning the hand wheels on the feed boxes at sides of the machine near the floor, and a spring locking pin holds the gears in the proper position. Five of the

changes are obtained by turning the hand wheel one revolution, and the multiplying lever shown on the front of the boxes changes the combination of driving gears so that by means of a second revolution of the hand wheel five more changes are obtained.

Both the right and left hand heads have independent feed boxes placed on either side of the machine, and the vertical and horizontal feeds are obtained through the same feed box. A friction brake is provided which is operated by a treadle placed within easy reach of the operator at the front and right side of the machine. The friction is applied to the inside of the lower driving cone pulley by means of a taper friction cone, and by operating directly upon the prime mover all shock and jar is avoided and the table brought to a dead stop

The machine is built to stand the heaviest cuts taken with high speed steel, and for this reason its proportions are very massive.

At the convention of the Implement and Vehicle Manufacturers' Association held at Chattanooga, Tenn., recently Newell Sanders, president of the Newell Sanders Plow Company, Chattanooga, Tenn., proposed that steps be taken to hold in that city in the year 1915 a semicentennial "Peace Exposition," to celebrate the semicentennial of the establishment of peace between the North and the South in the Civil War. Chattanooga, he explained, was a geographical center of the war and the scene of noteworthy battles. His proposition was re-

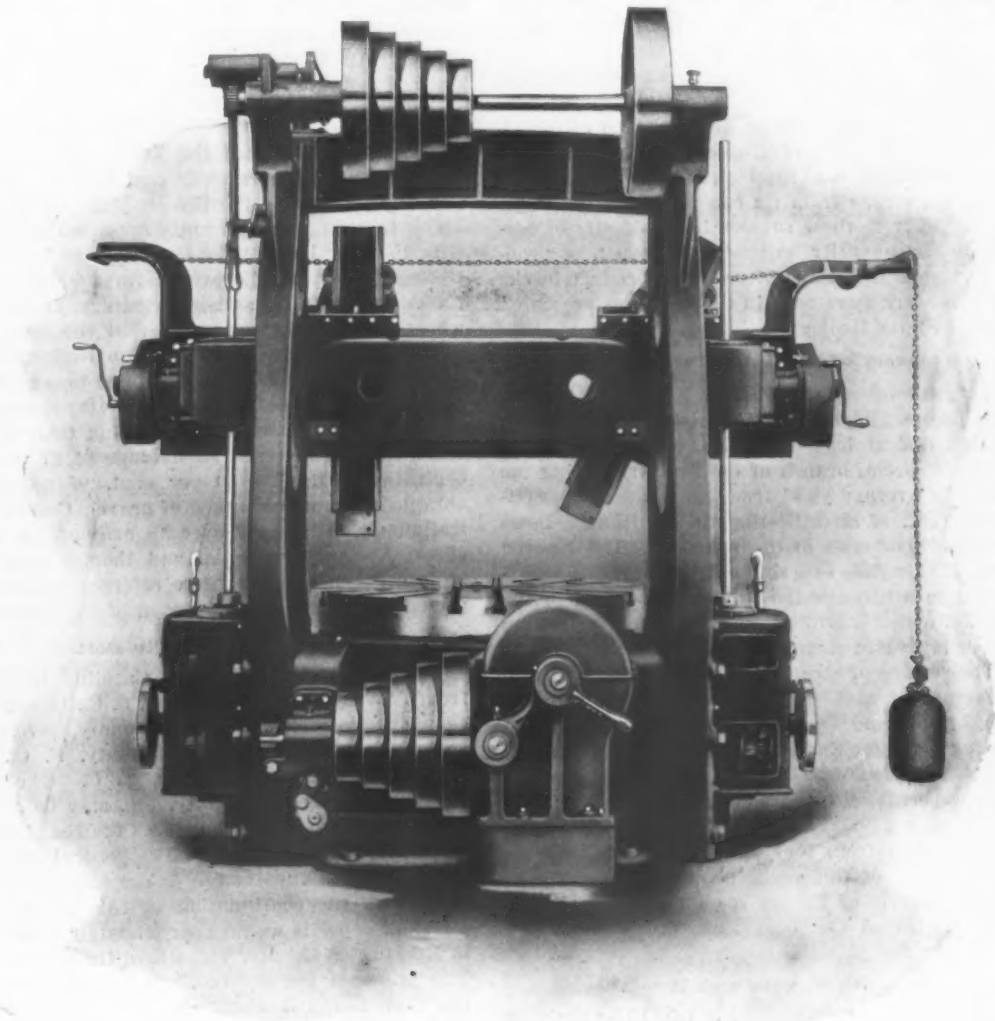


Fig. 2.—Rear View of the Colburn Boring and Turning Mill.

instantly in any desired position. The conical form of the brake entirely avoids distorting the bearings. The spindle has an angular bearing, making it self centering. This bearing is of large dimensions and a system of lubrication is provided. The speeds of the spindle are graded in geometrical progression from $2\frac{1}{2}$ to 45 revolutions per minute. The heads are entirely independent in their movements, both as to direction and amount of feed, and can be set to any angle either side of the central position. The rams have a travel of 26 inches in vertical or angular directions, and have steel racks and pinions. The tool holders are of steel forgings with shanks 3 inches in diameter. The mill will swing full 54 inches in diameter, and take 48 inches under the cross rail in its highest position. Below is a summary of dimensions and weights:

Swing	54 inches
Maximum distance under cross rail.....	48 inches
Table diameter.....	50 inches
Travel of rams.....	26 inches
Diameter of tool holder shanks.....	3 inches
Length of cross rail.....	7 feet 6 inches
Weight	18,000 pounds

ceived with great enthusiasm, and it is possible that the city of Chattanooga and the State of Tennessee may espouse the project and take steps for its active realization.

The annual meeting of the Engine Builders' Association of the United States will be held in New York City on December 9 and 10. Headquarters of the association will be established at Sherry's, Forty-fourth street and Fifth avenue. The first session on Friday will be opened by an address by the president of the association, C. A. Gates. The professional papers arranged for are as follows: "Costs," by C. M. Lauer, Philadelphia; "The Steam Turbine," by F. C. Bates, New York; "Employers' Associations," by Chas. L. Eldlitz, New York; "Salesmanship as an Applied Science," by R. U. Conger, New York. At eight o'clock on Friday evening the annual dance will be held at Sherry's. The session on Saturday will be executive, and will include the reading of reports of committees and the dispatch of the routine business of the association.

Development of American Tin Deposits.

Review of Industry by United States Geological Survey.

WASHINGTON, D. C., December 3, 1904.—An interesting report upon the development and production of the tin deposits of the United States in 1903 has just been completed for the United States Geological Survey by Joseph Struthers. This report, which is the most complete *résumé* of the subject thus far attempted by the Survey, embraces a brief description of the process of "detinning" by which a considerable number of companies are now engaged in recovering the metal from new tin scrap, and a statement of the most recent developments in the South Dakota, Wyoming, Alaska and the so-called Carolina tin belts, in addition to the latest available statistics of the world's production.

As in former years, there was no commercial production of tin from domestic ores in the United States during the year 1903, although many hundred tons of metallic tin and chemical salts of tin, chiefly the chlorides, have been obtained by the chemical or electrolytic treatment of new tin scraps from tin can and fruit tin factories. But as tin from these sources is manifestly of secondary origin the quantity so produced cannot be properly classified as a first mineral or metal product in the sense that those terms are used in the statistics presented by the United States Geological Survey.

Recovery of Tin From Scrap.

The treatment of new tin scrap, known as "detinning," has become of considerable importance in the United States, and at least ten companies were actively engaged in this special branch of the industry during the year 1903. The average yield from tin scrap is approximately 2 per cent. of metallic tin. In addition, a large number of small concerns in the principal cities recover the tin from old tin cans and similar material by a smelting treatment in a furnace, the tin being obtained in the form of solder, which is either used as a basis for making new solder or is treated chemically to yield metallic tin or tin salts. The residue of scrap iron is generally utilized in the manufacture of sash weights and other castings of inferior quality of iron.

A smelting plant for the furnace treatment of tin ores was erected at Bayonne, N. J., during 1903. The works included 4 reverberatory furnaces of a combined capacity of 50 tons of ore a day. The plant was designed to treat tin ore concentrates from the Malay Peninsula, but before the completion of the works a prohibitory tax was placed on the exports of tin ore from the Malay Peninsula, which destroyed the immediate prospects of the company owning the plant.

Deposits of South Dakota and Wyoming.

The mineral cassiterite, tin dioxide (SnO_2), containing 78.6 per cent. of metallic tin, has been found in no less than 17 States and Territories of the United States, yet in only two or three places have attempts on a large scale been made to place the industry in this country on a productive footing. Notable among the discoveries of domestic tin ore are the deposits at Harney Peak, in the Black Hills of South Dakota, and the deposits in North and South Carolina and in Alaska. The development of these deposits, however, has not as yet been carried forward to financial success.

The Harney Peak Tin Mining, Milling & Mfg. Company reports, through its receiver, that during 1903 there has been no development of the properties beyond the regular amount of work required for the annual assessment. The court having jurisdiction would not permit the company to make any extended test of the properties or expend any money except in connection with a part of the placer ground, concerning which it is necessary to satisfy the Land Office that tin ore was present in the gravels. There was abundant proof of the presence of tin ore, but the experiments were on too small a scale to determine accurately the average quantity of tin that the gravels would yield.

Although there has been no appreciable development

of the Harney Peak properties, the Tinton Tin Company, controlled by Chicago interests, has been working during the last two years on its claims located in what is known as the Nigger Hill and Beer Gulch districts, west of Deadwood and Lead, S. Dak., and 75 miles northwest of Harney Peak. This new district is partly in Lawrence County, S. Dak., and partly in Crook County, Wyo., being on the border line of the two States. The Tinton Tin Company has been operating a small concentrating plant, but owing to the lack of proper smelting facilities in the United States it has shipped to European ports for treatment a carload of concentrates said to contain an average of 62.5 per cent. of metallic tin. One parcel of its property, 140 by 50 feet, and another 90 by 6 feet, yielded an average mill return of 1.16 per cent. of metallic tin, which was 0.16 per cent. greater than the assays of hand samples made in the laboratory. The quantity of ore so far treated has averaged 1 per cent. of metallic tin, and the concentrates therefrom have ranged from 62.5 to 65 per cent. of metallic tin.

Developments in Alaska.

The tin deposits of the York region, Seward Peninsula, Alaska, were recently described by Arthur J. Collier in a bulletin of the United States Geological Survey, an abstract of which recently appeared in *The Iron Age*.

In the year 1900 Alfred H. Brooks of the United States Geological Survey discovered tin ore in the placers of the Anikovich River and its tributary, Buhner Creek. It was not until 1902, however, that the occurrence of tin bearing gravels was discovered on Buck Creek, 20 miles north of the town of York. Several tons of tin ores have been shipped from the deposits of Buck Creek, and several companies have been operating their claims during 1903. In one instance an average of 27 pounds of concentrates containing 60 per cent. of metallic tin was obtained from a cubic yard of gravel. Cassiterite is found irregularly distributed over an area of 450 square miles of the Seward Peninsula, and though many discoveries of lode tin other than those referred to have been prospected none has yet been proved of workable value.

Carolina Tin Belt.

What may be called the Carolina tin belt extends from Gaffney, Cherokee County, S. C., in a general northeasterly direction across this county, across the southeastern corner of Cleveland County, N. C., and across Gaston and Lincoln counties, N. C. The tin deposits found in Rockbridge County, Va., may be a continuation of the Carolina tin belt across Catawba, Iredell, Yadkin and Surry counties, N. C. The general direction of the rocks carrying the tin ore is the same as those in Virginia, and the continuation of this direction from the Carolina deposits would approximately cross those places in Rockbridge County, Va., where tin ore has been found. The principal locality in South Carolina where tin ore has been found is about one mile north of Gaffney, on land belonging to Capt. S. S. Ross.

The principal deposits that have thus far been located are the Ross mine at Gaffney, S. C.; the deposits in the vicinity of the town of Kings Mountain, N. C.; on the southern end of Chestnut Ridge, about 2½ miles northeast of Kings Mountain, and on the John E. Jones plantation, 7 miles northeast of Kings Mountain.

The Southern Railroad passes over a considerable portion of the tin belt, following almost the general direction of the formation from Kings Mountain to Gaffney. At the former place the railroad turns sharply to the east, crossing the tin belt, which continues toward the northeast. Thus any commercial deposits that may be developed will have good railroad facilities.

The first production of tin ore from the Carolina belt was during the summer and fall of 1903 and was from the Ross mine, the shipment consisting of 38,471 pounds of tin concentrates, which were sent to England for treatment. There has also been a small production at the Jones mine during the development work, but none of this has as yet been shipped.

World's Production of Tin.

At the present time none of the tin used in the United States is produced in this country, but it is all obtained

from foreign sources. The fact that about 43 per cent. of the world's production of tin is consumed in the United States emphasizes the importance of discovering a source of supply of this metal that can be controlled by this country. In the following table is given an approximate idea of the production of tin by countries during the last three years, which shows the growth of the tin industry as well as the yearly production of each of the countries named:

Country.	1901. Gross tons.	1902. Gross tons.	1903. Gross tons.
Malay States.....	52,989	53,756	54,797
Banka and Billiton.....	19,365	18,765	20,060
Bolivia	9,670	10,150	9,500
Cornwall, England.....	4,125	3,950	4,150
Australia	3,276	3,206	4,991
Miscellaneous	450	350	395
Totals.....	89,875	90,177	93,893

As is seen from this table there has been an increase in the total amount of tin produced each year, but this is still short of the demand for this metal, as indicated by the great decrease in the stocks of tin that have been kept on hand in the various countries.

The production of tin during 1903 was consumed approximately as follows: 43 per cent. by the United States, 28 per cent. by Great Britain, 22 per cent. by other European countries and 7 per cent. by India and China. This, of course, does not include small productions used in Mexico, Japan, Bolivia, &c.

The average prices of tin per pound in New York in 1903 were as follows: January, 28.33 cents; February, 29.43; March, 30.15; April, 29.81; May, 29.51; June, 28.34; July, 27.68; August, 28.29; September, 26.77; October, 25.92; November, 25.42; December, 27.41; year, 28.09.

W. L. C.

The Taylor Compressed Air System at Norwich.

The hydraulic compressed air system of the city of Norwich, Conn., which replaces steam in not a few of the stationary engines of the city, has now been in operation for two years, long enough to permit of an intelligent analysis of its merits and of its cost. The general opinion among the manufacturers of the city is that in small units the air is a desirable and economical substitute for steam. In larger units the air has its advantages, but it is more expensive.

The Taylor system of hydraulic compression is employed to develop 1000 horse-power of compressed air, delivered to the consumer at a pressure of 88 pounds at the engine gauge, through a pipe system extending to a maximum distance of three miles from the compressor. These details were contained in a description of the system printed in *The Iron Age* of July 9, 1903. Briefly speaking, the plant consists of a shaft sunk in the Quinnebaug River below falls with 18 feet head, the shaft being 208 feet deep and 24 feet in diameter, with a bell shaped chamber at the bottom with a maximum diameter of 52 feet. There is an inner shell 14 feet in diameter at the center of the hole, which is the downflow pipe. The water, pouring down this hole at great pressure, takes with it large quantities of air in the form of bubbles, compressing it as it falls, and at the bottom a separator removes the air from the water and it is stored for delivery to the mains. The loss of pressure in transmission is 2 pounds. The air is dry and quite suitable for its purpose, as compared with air from a mechanical compressor.

The compressed air is introduced to the engine cylinder exactly as if it was steam, it being perfectly possible to use the engine with steam one day and compressed air the next, which is necessary at times of low water, the compressor, of course, being dependent upon the power of the water to the same extent as a water wheel.

Consumers of the power in small units find it all that can be desired. In a large textile finishing plant it is employed in operating a number of small engines which are used intermittently, and is said to be economical as compared with steam. Other consumers who use it in small engines express their satisfaction, excepting, of course, that there is inconvenience at times of low

water, just as in other forms of power generated by water. It has the great advantage of constantly maintained pressure in certain classes of establishments, as, for example, a wood working shop where heavy additional loads are necessary, which with steam are apt to pull down the pressure of the boilers to an inconvenient extent. No matter what load is put upon an engine running with air, the gauge is hardly affected. The gauge hand moves slightly if the load be too suddenly applied, but it returns to the 88 point almost instantly. These are the advantages of the system.

The compressed air is sold at prices varying from \$40 to \$50 a horse-power per year. In small units this cost compares favorably with steam, according to the experience of consumers at Norwich, who get their coal at seaboard prices. In figuring costs, however, it is necessary to reckon in the cost of heating the air. To pass it through a heater adds to its efficiency and is desirable at all seasons. In the cold months it is absolutely necessary, because the chilled air entering the engine cylinder causes the oil to congeal and seriously interferes with the lubrication of the engine parts. It takes coal to run the heater, which is, of course, an additional expense.

In Norwich horse-power in 100 horse-power units costs about \$36. In 300 horse-power units plants are operated at about \$25 a year. In still larger units the cost is less. Buildings must be heated in the cold weather, and if engines are operated by air, or if electric power is received from stations outside of the works, the additional cost of heating must be reckoned in making comparisons. On the whole, it will be seen that where engines of large power are used steam is much cheaper than air.

No comparison of the cost of electric power delivered from outside sources is available in Norwich, because the city took over the local company's power plant just before it was ready to enter into competition with the compressed air company. But taking New England as a whole, from \$75 to \$100 is the price for small units of electric power, which is an advantage for the air.

The Norwich plant cannot be considered as a basis on which to estimate an investment, because of disastrous freshets which carried away the plant time and again, bringing its total cost up to \$750,000, it is said. Probably the plant could be duplicated for one-third of that sum, according to the belief of Norwich manufacturers.

Dover Iron Products.—Good iron, made in old fashioned ways, is slowly but surely growing in demand, for roofing tin, corrugated sheets, galvanized sheets, bar iron and special shapes. Appreciating this fact, the Dover Forge & Iron Company, Canal Dover, Ohio, has built a plant to manufacture genuine charcoal iron in knobbling fires with charcoal fuel, also having a puddling department to make refined iron. The company has not built any finishing mills. Its products consist of blooms, billets and bars, which are sold to other mills for rolling into smaller sizes or special sections, also billets for forgings. This unique plant has recently been very much improved with a view of securing uniformity in quality. The products are made according to old, well tried and successful methods. The works are exceedingly well built, modern ideas having been introduced to make the results perfect. Dover charcoal iron is now being used with success for rolling black plates for tinning and for many other purposes where durability is the main consideration. Dover charcoal iron and refined iron billets are made in various sizes, ready for rerolling, of a quality suitable for carriage work and other exacting requirements.

The effects of the Laurier Retaliation Act may result in the upbuilding of the Canadian side at Niagara Falls. One of the first companies to take steps looking to the erection of a Canadian branch is the Natural Food Company, which company has secured options on a site on the Canadian side, and it is understood that if the proper railroad facilities can be obtained a Canadian branch will be opened there.

The Dynelectron.

BY S. D. V. BURR.

Every chemical action that is violent enough to be recorded by instruments produces an electric current. Like results are caused by mechanical movements that place bodies in changing relations with each other. But these currents can be utilized only when the disturbances, chemical or mechanical, are of appreciable magnitude. It is easier to measure the power of Niagara than that of a rain drop, and easier to calculate the force imprisoned in a ton of dynamite than the energy expended by a firefly. Therefore, as it is impossible to go far with positive knowledge, the beyond must be studied by analogy, and since electric action is always found in any

tained only with expensive substances, and with cheap substances the current is too weak to be of much value.

Scientists have long dreamed of transforming the tremendous energy stored in coal into electricity. They have tried to do this without the intervention of costly or cumbersome apparatus, but have so far only demonstrated that the transformation is possible. Only a very small percentage of the electricity has been obtained which should result from the union of carbon and oxygen in the combustion of coal. The conditions are ideal, but their utilization remains for the future. The two elements, carbon in coal and oxygen in air, have a strong affinity for each other, and their union is under absolute control; but as yet the electrical results have been insignificant.

All investigators have not confined their labors to

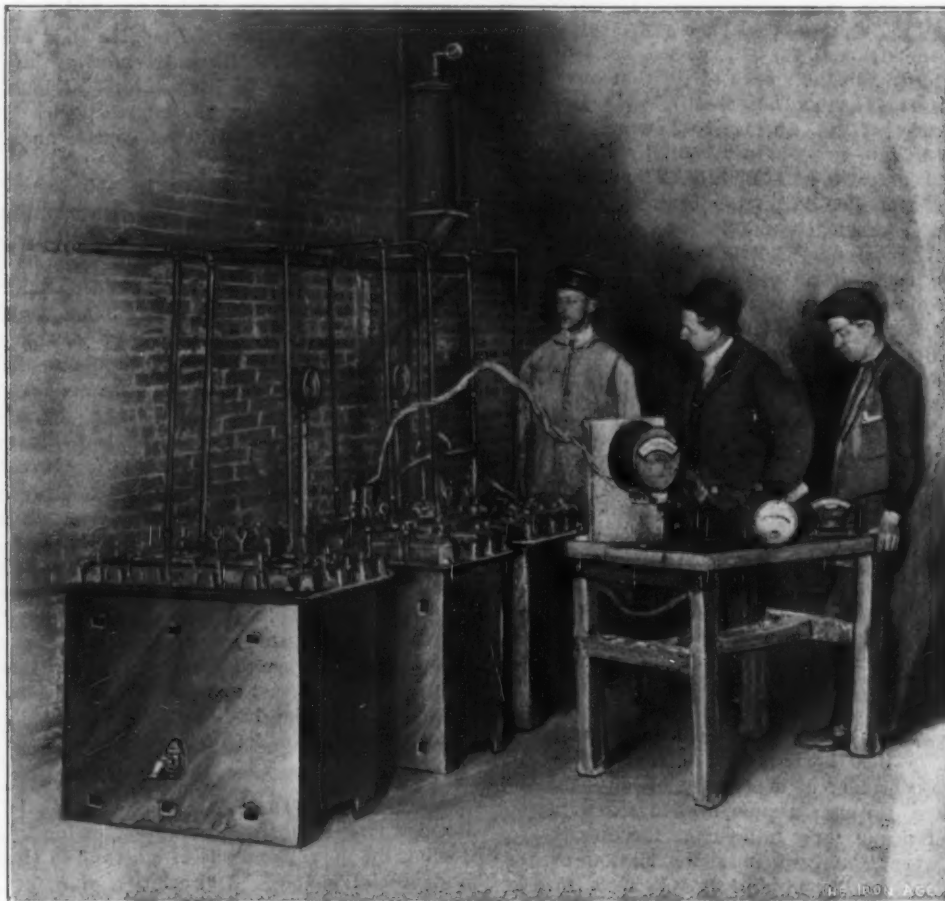


Fig. 1.—Three Dynelectron Cells Coupled in Series. Each Cell produces 9-10 Volt, 600 Amperes.

movement which can be investigated the law is assumed to be universally true.

A chemical action to be of any service as a useful and commercial source of electricity must be rapid or violent. The strength of a battery depends upon the speed of the chemical change taking place within it, or the rate of the destruction of the element. The ordinary Leclanche cell is weak as compared with a Grenet, which is also weak when likened to a Bunsen. In the first the action is very slow, in the second it is quicker, while in the third the destruction reaches the maximum and the action is most powerful. In all primary batteries the current is proportional to the violence of the chemical action. But, unfortunately, it also appears to be directly proportional to the cost of the materials of which it is composed. Zinc, the metal generally employed, is extremely expensive compared to the electrical output obtained, hence it is not commercially practicable to use it in generating powerful electric currents. The search for other substances which would by their chemical reaction produce the results hoped for has not yet been successful. It is a strange fact that the capacity of primary batteries varies almost directly as the cost of the component materials. Powerful currents are ob-

solving the electro-carbon problem, but have sought other substances giving the necessary chemical reactions and which would be more amenable electrically. One of the first of these has been James H. Reid of Newark, N. J., who has consistently and persistently followed the question for several years. He has succeeded in obtaining an electric current of commercial proportion by utilizing the chemical action and reaction of substances that are cheap. These substances are not destroyed, in the sense that they are so changed as to be of no use in the apparatus, but a new combination is formed which is again changed back to the original. These alterations are taking place uniformly and without intermission in the cell, and the loss of the substances is insignificant.

Description of the Apparatus.

The construction of a Dynelectron cell, as the inventor terms it, will be understood from the accompanying engravings and the following description: All of the parts are placed within a cast iron shell, A, Fig. 4, which measures 16 x 16 x 26 inches. When the cell has been assembled the case is air and water tight, except for vents or exhaust openings E E, the purpose of which

will be explained later. Depending from the cap covering the shell is a closed central chamber, in the sides of which are placed iron tubes D, open at both ends. Within each tube is a porous carbon rod mechanically attached to the iron but insulated from it. The carbon rods are bored part way through, the inner ends being open to the central air chamber and the outer ends closed. Each cell contains 64 of these rods arranged as shown in the engravings. The rods are separated from their containing tubes by a space of about 1-16 inch. The central chamber is air tight and contains the bus bar B, to which the rods are connected by cables. The side chambers, into which the carbon tubes project, contain an electrolyte composed of 15 gallons of water and a small quantity of sodium hydrate and iron oxide. It will now be perceived that the unit, as it stands, provides two poles, a negative and a positive, the iron shell constituting the former and the carbons the latter. Current is taken from the apparatus at F and G.

Air and Heat Necessary.

In its present condition the chemical action is practically nil, since caustic soda will not attack iron violently, and the electrical output is imperceptible. Two things are essential to bring the unit into active operation, air and heat, and neither is effective without the other. The central chamber containing the bus bar and carbon terminals is connected with an air reservoir carrying air at a pressure of 10 to 12 pounds per square inch. The cell is heated, when arranged as in Fig. 1, by a gas furnace. It has been found that there is what may be termed a critical temperature at which the maximum effect in the shape of electric current is produced. This temperature is 392 degrees F., at which the cell must be

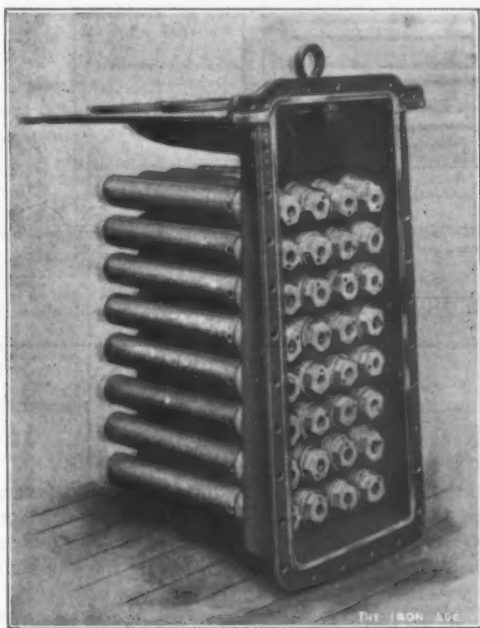


Fig. 2.—One Element Carrying Carbon Electrodes and Their Containing Tubes.

maintained. Below this the action is too sluggish and above it too violent.

Chemical Action.

The air provides oxygen which unites with the hydrogen of the sodium hydrate and escapes as vapor. Since it can only enter the electrolyte through the pores of the carbon rods it permeates every part so that the action is uniform throughout. As the hydrogen of the sodium hydrate unites with the oxygen of the air to form water, which passes through the vents as vapor, there remains a sodium dioxide. This in turn combines with water and forms a highly caustic hydrate of sodium. The ferric oxide changes to a sesquioxide, a minute portion of which escapes when the cell is first put in action. No part of the sodium is liberated, but is first changed to a dioxide and then recombined as a

hydrate. These actions are continually taking place in all parts of the electrolyte.

The vents or escape passages E are about 3 inches in diameter and open into the chamber containing the carbons and their tubes. Each vent contains several layers of canvas and wire gauze, which prevent the escape of the electrolyte but offer only a slight resistance to the passage of the vapor. Each of the cells of the size mentioned above gives 9-10 volt and 600 amperes, or nearly 1 electrical horse-power. Every 4 square inches of carbon surface gives 1 ampere. Cells of an improved form



Fig. 3.—The Two Elements United and Ready to Be Placed in the Containing Shell.

are now being constructed which, with the same outside dimensions, will contain many times the carbon surface and have a corresponding increase of electrical energy.

Experiments with Cells.

A few days ago the writer witnessed several very interesting experiments with two of these units. A Weston voltmeter and ammeter were placed in the circuit. When the cells had been brought to the desired temperature, but with no air passing through the carbons to the electrolyte, there was no indication of electric current by the instruments. The instant air was admitted the pointers began to move, and they reached their maximum position when the circulation of air through the apparatus had been established. The pointers began to fall toward zero as soon as the air had been cut off. The mutual dependence of heat and air was illustrated in a still more striking way. A short length, perhaps 2 inches, of fine iron wire was introduced in the circuit. This was soon heated to bright red. When the supply of air was shut off the wire gradually lost its color, and after a short time was black. The time required for this action was due to the fact that there was considerable air in the cell after the supply had been cut off, and that the chemical action continued until this had been completely exhausted. As soon as a fresh supply of air was admitted the wire was raised to incandescence, the heating of the wire requiring much less time than the cooling. Short circuiting a cell, no matter for how long a period, produced no hurtful effect, as the instruments afterward indicated precisely as before.

Six cells, similar to those illustrated, have been finished. They will be placed in one group and the electric current they generate, about 5 horse-power, will be utilized in running a portion of the works. They will be subjected to thorough tests in order to ascertain their cost of operation under actual service conditions.

Commercial Value of the Process.

The commercial value of this method of obtaining electricity will depend solely upon the cost of maintaining the cell at the required temperature, 390 degrees F., and the cost of supplying air. These are the only expenses provided there is no loss, as stated, in the component parts of the electrolyte. It is claimed that tests have shown that it requires only 3900 British thermal units to keep the cell at its best working temperature, or, in other words, an expenditure of 6 cubic feet of gas of 650 heat units per cubic foot. This is equal to about 1-3 pound of good anthracite coal. It is not probable

that these figures will be even approached with the apparatus as it now stands, because the furnace is crude and the cast iron containing shell, with its thick walls, is better adapted to the rapid dissipation of the heat of combustion than it is for its transmission to the electrolyte. A rectangular cast iron vessel has never been recognized as an economical steam generator. Having discovered a simple method of generating an electric current the inventor will naturally take up the consideration of those features upon which the commercial prosperity of the device must depend—namely, reliability and economy. The tests about to be undertaken with the six units mentioned will undoubtedly throw light upon these questions.

The apparatus is manufactured by the Dynelectron

"The maintenance of a public naval gun factory in a state of such efficiency as to be capable of turning out guns of all calibers required for the armament of naval vessels is undoubtedly desirable. The existence of such an establishment tends to keep prices down and to prevent the formation of monopolies for the supply of ship's armaments. I do not, however, agree with certain of the ordnance experts in the opinion that the navy should, under ordinary circumstances, undertake to manufacture all, or even the greater part, of the guns and ammunition required for the service. On the contrary, I think it is better to adhere, in the matter of armament, to the general policy adopted with respect to ships and armor. At more than one navy yard it is possible to build war ships, and the Government is actually building

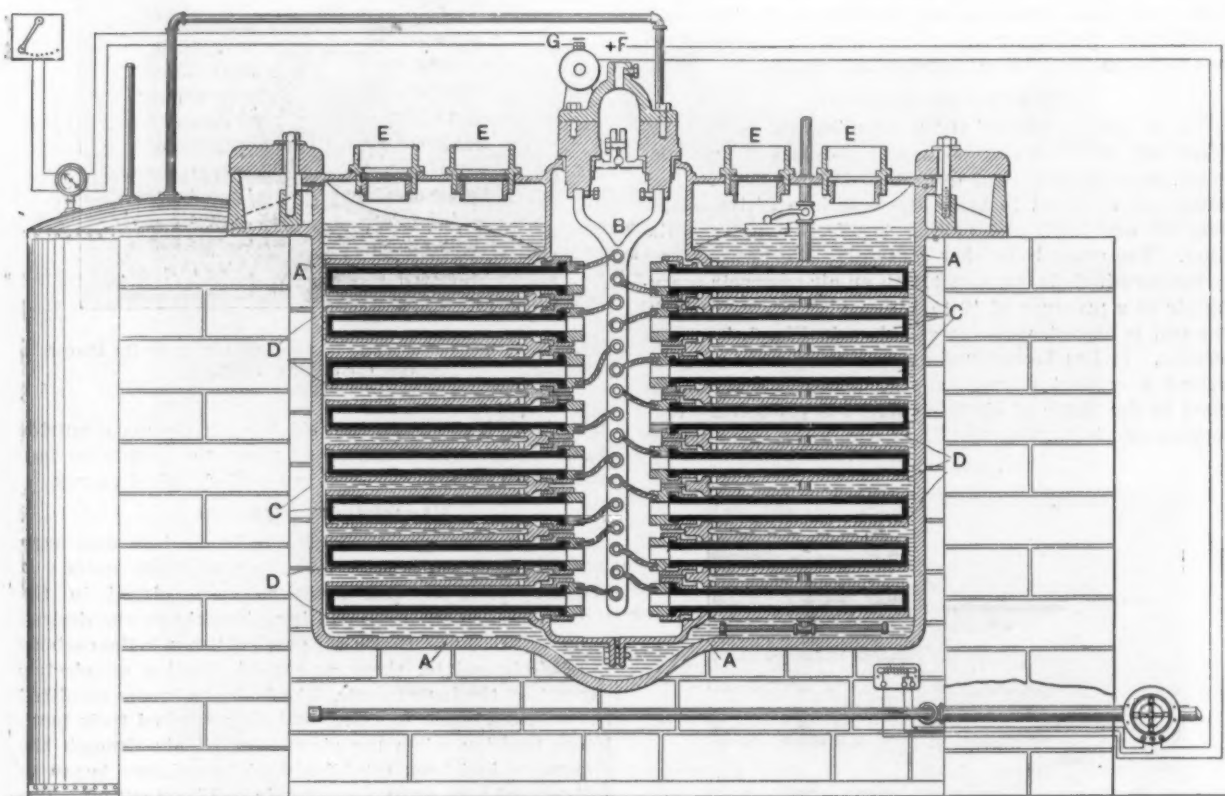


Fig. 4.—Sectional Elevation Through Complete Cell. A, Shell; B, Bus Bar; C, Carbon Electrodes; D, Iron Tubes Surrounding Carbons; E, Vents.

Company, 68 William street, New York, with factory at Newark, N. J.

Secretary Morton's Attitude Toward Contractors.

WASHINGTON, D. C., December 6, 1904.—The first annual report of Secretary of the Navy Morton is an exceedingly businesslike document and will be examined with special interest by manufacturers who have dealings of any kind with the Federal Government.

With regard to building of war ships in Government yards and the expansion of the facilities of naval gun factories he says:

"It is the opinion of the chief constructor that ships built by the Government at navy yards will cost more money than if built at private yards by contract. A different question is whether they will prove better than contract ships. Other considerations must be taken into account also in deciding the matter of Government construction of vessels of the larger class. . . . I concur, however, with the chief constructor in the view that the repairing and overhauling of naval vessels must at all times remain the important work of the navy yards, and that there should be no change in the policy of building public ships, as a general rule, by contract at private establishments.

them at some of the yards; but this is the exception. Most of the new ships are under construction at private establishments, and all armor is furnished by private concerns. It would seem wise to follow the same general policy with respect to armament.

"I am led to this conclusion by a number of considerations. The Government should not unnecessarily enter the industrial field. The development in time of peace of large private establishments, with extensive plants and a force of skilled artisans capable of building ships of the first class, making armor of the best quality in all weights, and constructing guns of every kind and supplying fixed ammunition therefor, is desirable, inasmuch as the existence of such establishments may be of important service in time of war.

"Furthermore, it is not to be supposed that when such plants shall have been successfully established they will confine themselves exclusively to the making of ordnance for the United States. They will doubtless find markets elsewhere, and will do other work in kindred lines, thus adding to the general wealth and prosperity. Again, large numbers of skilled American workmen cannot be long engaged in such a field without developing improvements in guns and their appurtenances and in machinery for their manufacture, which will prove of national advantage."

W. L. C.

The Milwaukee Pumping Engine Contract.

Bids were opened in Milwaukee, Wis., for the fourth time, November 29, by the Board of Public Works, for a 20,000,000-gallon pumping engine for the North Point Water Works Station. A surprise was offered at that time by the receipt of a bid from the Brown-Corliss Engine Company, Corliss, Wis., which had not previously bid for the contract, and its proposal of \$64,500 was the lowest bid submitted. Three other bids were received, one from the Allis-Chalmers Company at \$65,000, one from the Filer & Stowell Company at \$67,900, and one from the William Tod Company, Youngstown, Ohio,

The New Warner & Swasey Turret Lathe.

The turret lathe which is the latest design of the Warner & Swasey Company, Cleveland, Ohio, embodies several important changes from the former standard for this class of tool. Two of the more pronounced of these are the use of a turret of hollow hexagonal form, and a general increase in the weight and proportion of parts to render the machine capable of using high speed tool steels to the limit of their efficiency. The lathe is especially adapted for producing duplicate machine parts with a high degree of accuracy and at a low cost. At the same time the tools are so easily set and changed for different kinds of work that even where but few pieces

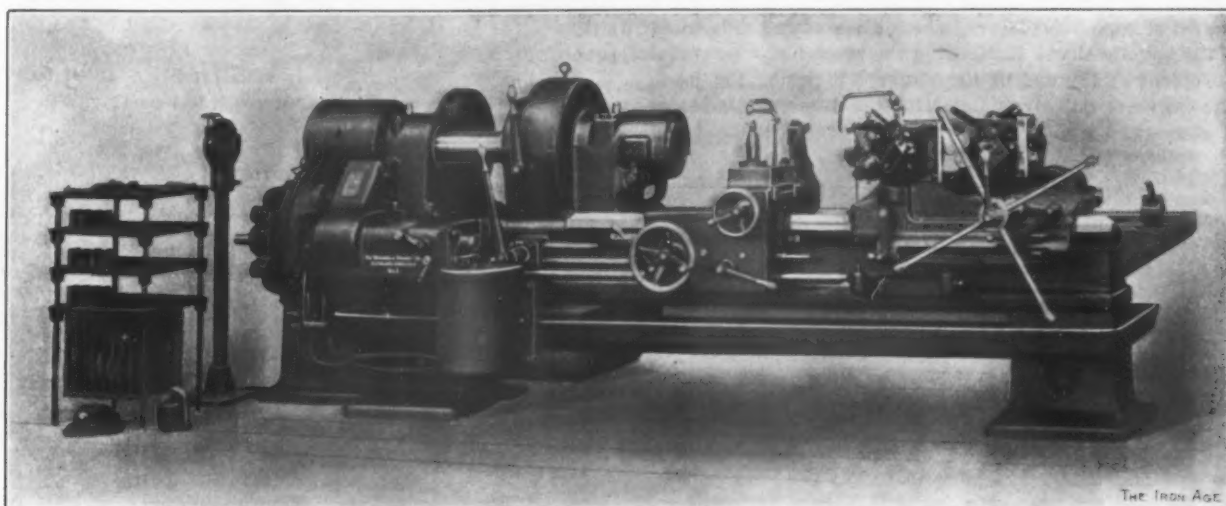


Fig. 1.—The No. 3 Warner & Swasey Hollow Hexagon Turret Lathe.

which submitted three proposals of \$68,200, \$72,000 and \$76,000. The latest specifications made no mention of the eight-hour day labor clause, which was the means on former occasions of bringing the pumping engine bids into court. The history of the effort by the city to award the contract dates from the first opening of bids July 15, when the bid of the William Tod Company was the lowest. The Common Council had, however, after the bids were called for, passed a resolution to the effect that specifications should provide that only eight-hour labor should be employed on the work, and the board rejected the bids. On July 2 new bids were called for. The William Tod Company refused to bid, claiming that it was entitled to the contract, and the Allis-Chalmers Company's bid for \$64,000 refused to recognize the eight-hour clause. The Filer & Stowell Company also made a proposal, which was the lowest at that time, but it also refused to employ only eight-hour labor. On July 15 bids were opened for the third time, when the William Tod Company submitted a bid of \$74,000 and embodied the eight-hour labor clause in its proposal. The contract was thereupon awarded to the William Tod Company. The Filer & Stowell Company, through W. D. Reid and T. J. Neacy, as taxpayers, then brought suit to test the legality of the eight-hour clause, and the Federated Trades Council asked to be made co-defendant with the city on the ground that the City Attorney had given it as his decision on frequent occasions that no such clause would hold in law. The court decided against the eight-hour labor clause, and the contract of the William Tod Company was thereby abrogated. The specifications for the engine have been somewhat changed since the first bids, with the result that there will be about 100 tons more iron in the pump than originally planned and its capacity will be increased to raise 160,000,000 pounds 1 foot in 24 hours, instead of 150,000,000 as originally specified. The cylinder will be larger and the several parts correspondingly heavier. The Board of Public Works held the bids for a few days under consideration, during which they visited the works of the Brown-Corliss Company, where they were fully satisfied as to its ability to carry out its contract, and on December 2 the contract was awarded that company on its tender of \$64,500.

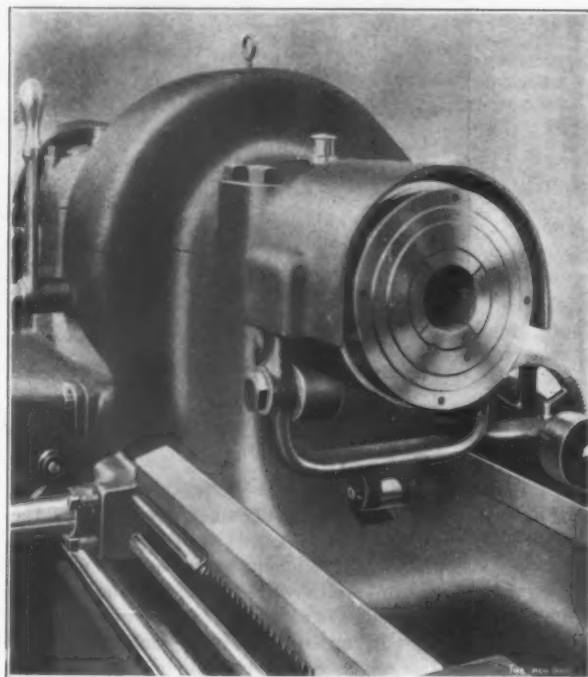


Fig. 2.—End On View of the Automatic Chuck.

of a kind are to be made a considerable saving of time is effected over old methods. The lathe shown in the accompanying illustrations is designated as No. 3, and is the largest of three sizes of the hollow hexagon turret lathe. Characteristic features are great strength and rigidity, ample power, wide range in speeds and feeds, instantly changeable, improved high speed turning tools and rapidity and convenience in manipulation.

The machine has a capacity for bars up to $3\frac{3}{8}$ inches in diameter through the automatic chuck, and will turn any length up to 36 inches, and chucked work up to a diameter of 24 inches may be swung over the vee of the bed. At the right the head rests on a line bearing laterally so that an irregular foundation or floor will not throw

the machine out of alignment. The head and bed are cast in one piece, the bed being exceptionally deep and wide and the vees unusually large. The cone is geared $3\frac{1}{2}$ to 1, and has back gears of a ratio of 13 to 1, which are thrown in or out of action by friction clutches, manipulated by the lever seen in front of the head stock in Fig. 1. The spindle may be driven at 12 speeds, from 18 to 190 revolutions per minute, increasing in geometrical progression, giving cutting speeds of about 100 feet per minute on diameters from 2 to $3\frac{3}{4}$ inches.

Bar stock of any shape may be handled by the automatic chuck and the power roller feed. The head for holding the chuck is forged on the spindle, bringing the chuck close up to the front bearing with a minimum overhang. The chuck is operated by the long lever on the front of the machine below the head, working through a system of compound levers, which gives a long movement to the spindle sleeve for feeding the stock and a powerful movement at the end of the stroke for closing the jaws. The jaws are quickly changed for the different diameters of stock, and a single screw adjusts the roller feed and

The hollow hexagon turret, which is best shown in Fig. 3, is 18 inches across the flats, and has a broad bearing on the carriage. It revolves on and is kept central by a large taper bearing, having provision for taking up wear, and its trussed form affords a very rigid support for the tools, resisting end thrust as well as torsional strain. The interior faces of the turret being also hexagonal allow the tools to be bolted in place from the inside, leaving the entire outer surface available for the tools and their parts. The index is nearly the full diameter of the turret, and the lock bolt is placed directly under the working tool. The backward movement of the saddle gives the turret its partial revolution, which begins as soon as the working tool is free from the stock. The adjustable stop shown at the extreme tail end of the machine is clamped to the feed rack and governs the position of the saddle at the time when the turret begins to revolve.

The tool equipment regularly furnished is adapted for a great variety of work, including thread cutting. The universal turners are specially adapted for using high

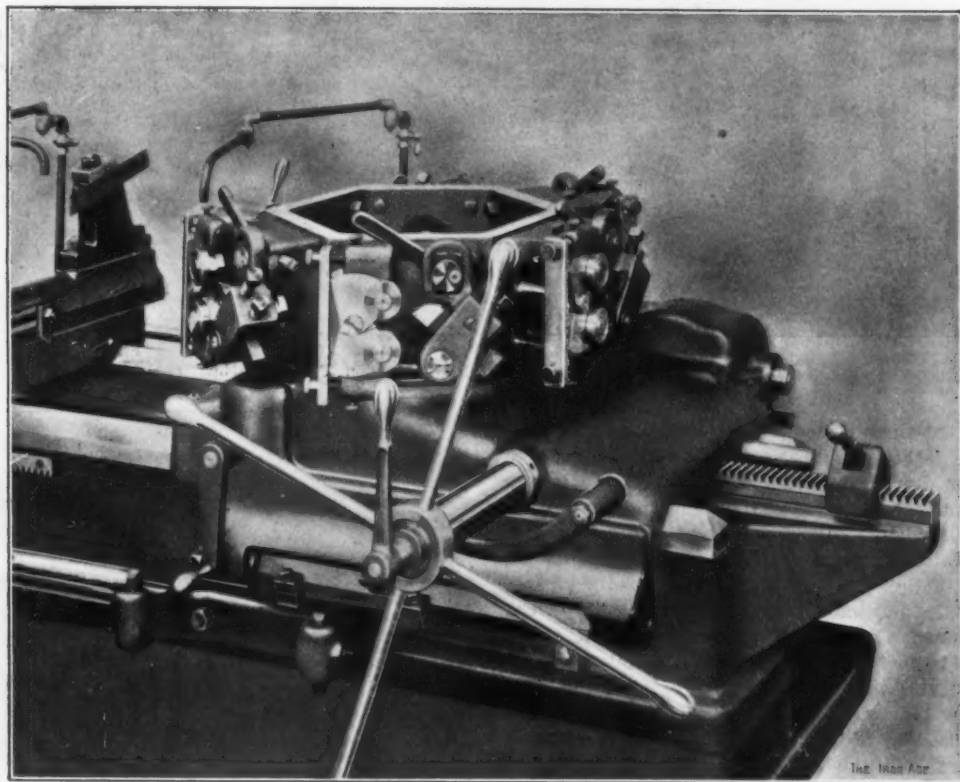


Fig. 3.—View of the Turret, Showing Tool Equipment, Turret Saddle and Independent Stops.

the guide fingers. The roller feed is operated by the same lever as the chuck, and since it does not depend upon the spindle for its power the stock can be fed equally well at any speed, or even if the machine is standing still.

The turret saddle slides directly on the bed, doing away with all overhang. It is gibbed to the outer edge of the bed by flat gibs extending its entire length and carries the turret, the feed mechanism, the individual stops and the mechanism for revolving the turret. There are four changes of feed in either direction, varying from 20 to 100 to the inch, and screw cutting feeds for leading-on dies. The feed rack is attached to the top of the bed midway between the vees, and is as high up as possible to avoid torsional strain attending the usual construction where the rack is placed at the side of the bed. The automatic feed is thrown in or out by the single curved lever at the right of the saddle near the turnstile. Power quick traverse in either direction for the rapid handling of the turret and for indexing is obtained through the lever in front of the turnstile. The independent adjustable stops for each face of the turret are located in front of the saddle, where they are most accessible for changing and adjusting and are least apt to be fouled by chips and dirt.

speed tool steels. One of the special features of the tool is the roller back rest, shown in Fig. 4, which eliminates the excessive friction due to the high speeds, and the improved construction and great rigidity of the tool insure the highest degree of accuracy. The holder carries the cutting tool and swings about a stud, and can be easily and accurately adjusted by means of a screw, while an eccentric lever affords means for quickly withdrawing the tool from the work.

The carriage has a 30-inch longitudinal traverse and a 10-inch cross traverse, both with four changes of feed in either direction. The longitudinal feeds vary from 24 to 120, and the cross feeds from 62 to 312 to the inch. Both feeds have adjustable automatic trips. There are two speeds with automatic trips for the longitudinal traverse, and the cross feed screw is fitted with a graduated dial. The front of the cross slide is equipped with suitable tool posts for holding forming and turning tools, while the rear end carries a holder for cutting off blades. All of the feeds are gear driven, and are quickly and easily changed by simply shifting a lever in the feed box, which is conveniently located in front of the head, as shown in Fig. 1, and in greater detail in Fig. 5. The turret and carriage feeds are independent of each other.

The pan and oil reservoir are large, and a geared oil pump, which runs in either direction, delivers a copious flow of oil from the reservoir to the cutting tools for both the turret and carriage through two systems of piping. All gears and other revolving parts are covered by suitable metal guards.

The machine illustrated is electrically driven by a variable speed motor direct connected to the back gear shaft. For belt drive the spindle is fitted with a three-

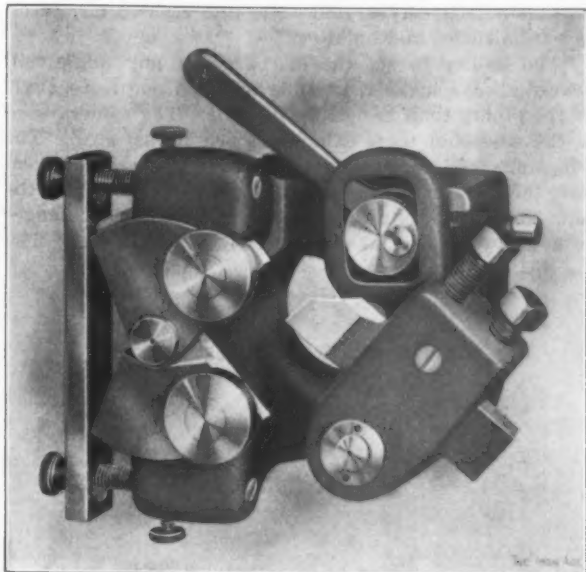


Fig. 4.—A Universal Turner with Roller Back Rest.

step cone, and a triple friction countershaft is included in the equipment. The net weight of the machine is about 12,000 pounds.

Westinghouse Electric Officials.—A number of changes have been made in the executive offices of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Newton Carlton has been appointed one of the vice-presidents of the company, the appointment to take effect at once. L. A. Osborne, formerly fourth vice-president

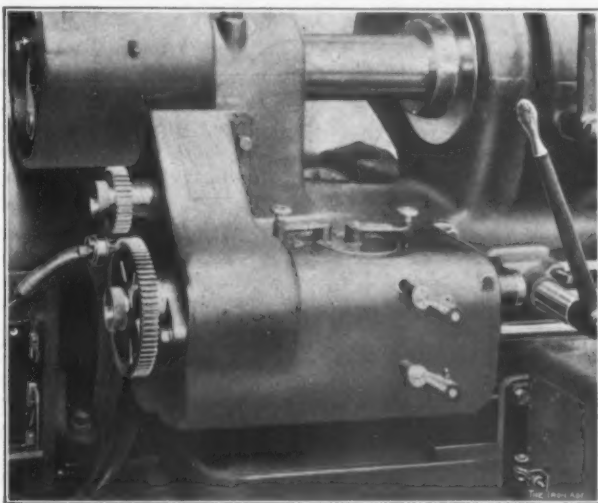


Fig. 5.—The Feed Box for the Turret and Carriage.

of the company, has been promoted to the office of third vice-president, made vacant by the resignation of Ph. Ferd Kobbe, who has retired from his more active duties on account of ill health. Mr. Kobbe will continue his membership on the Board of Directors. A list of the officers of the Westinghouse Company, as a result of these changes, is as follows: George Westinghouse, president; Frank H. Taylor, second vice-president; Newcomb Carlton, four vice-president; L. A. Osborne, third vice-president; Charles A. Terry, secretary; T. W. Semon, treasurer; W. G. Hebard and W. M. McFarlane, acting vice-presidents, and Louis C. Bennett, auditor.

Test of Armstrong-Whitworth Steel.

A test of the new tool steel made by Sir W. G. Armstrong, Whitworth & Co., Limited, Manchester, England, was made in New York on December 3 under the auspices of the American Electric & Controller Company in the presence of a number of invited engineers and technical paper representatives. Something of the remarkable properties of this steel are already known to our readers through the abstract of J. M. Gledhill's paper presented to the recent convention of the Iron and Steel Institute and printed in *The Iron Age* of November 10, 1904. The test was conducted by Walter Carter, who represents the Armstrong-Whitworth Company and is in this country to make demonstrations of the steel to introduce it into American shops. Three trials were made, the results of which were as follows:

Test No. 1, on heavy pipe flange, outside diameter $15\frac{1}{2}$ inches, inside diameter 8 inches:

Time required to face it.....	3 minutes 38 seconds
Maximum cutting speed.....	125 feet per minute
Minimum cutting speed.....	115 feet per minute
Average cutting speed.....	120 feet per minute
Feed .....	.48 to the inch
Depth of cut.....	$\frac{1}{8}$ inch
Horse-power required at boring mill pulley.....	3.42
Estimated electrical horse-power input.....	3.73

Test No. 2, standard pipe flange, outside diameter $15\frac{1}{2}$ inches, inside diameter 9 inches:

Time required to face it.....	2 minutes 8 seconds
Maximum cutting speed.....	78 feet per minute
Minimum cutting speed.....	72 feet per minute
Average cutting speed.....	75 feet per minute
Feed .....	.16 to the inch
Depth of cut.....	$\frac{1}{8}$ inch
Horse-power required at boring mill pulley.....	4.92
Estimated electrical horse-power input.....	6.1

Test No. 3, on cast iron disk, faced from a diameter of $24\frac{1}{2}$ inches to a diameter of $12\frac{3}{4}$ inches:

Time required.....	3 minutes 58 seconds
Maximum cutting speed (momentary).....	125 feet per minute
*Maximum cutting speed (maintained)	102 feet per minute
Minimum cutting speed.....	98 feet per minute
Average cutting speed.....	100 feet per minute
Feed .....	.16 to the inch
Depth of cut.....	$\frac{1}{8}$ inch
Horse-power required at boring mill pulley.....	5.23
Estimated electrical horse-power input.....	6.44
Time required to continue the cut to a diameter of $3\frac{1}{4}$ inches	1 minute 15 seconds

In all three trials the cutting was performed on a hard grade of cast iron, the tools were not reground and to all appearances were uninjured. The machine used was a 31-inch boring mill built by the Rogers Machine Tool Company. Running with the back gears out, the cutting speed in feet per minute was kept practically constant by means of an American Electric & Controller Company rheocrat, description of which appears in another part of this issue. The speed was recorded by a Warner cut meter kept continuously against the work at the cutting line throughout each run. A General Electric motor was used. Both the motor and rheocrat controller were of 3 horse-power rated capacity. It will be noticed that this power was exceeded in all the tests, but the overload was carried without damage to either the motor or controller.

The fire loss of the United States and Canada for the month of November, as compiled by the *New York Journal of Commerce*, shows a total of \$11,515,000, which is about \$2,000,000 less than the sum chargeable against the same month of last year, but about \$1,000,000 more than the figures of November, 1902. The total fire loss for the 11 months ended November 30, 1904, is estimated at \$232,941,700, as compared with \$138,000,000 for the first 11 months of last year, and \$134,600,000 for the corresponding period of 1902. The heavy losses of the current year were, of course, immensely swollen by the great fires in Baltimore, Md., and Toronto, Canada, but even deducting these losses the 1904 aggregate would still heavily exceed that of former years.

* Speed reduced on account of excessive overload on motor.

The Indiana Volume Blowers and Exhausters.

A novel form of blower has recently been brought out by the Indiana Fan Company, Indianapolis, Ind. The features of peculiarity are more pronounced in the exterior of the blower. As will be noted from the illustrations, the blower is supported by two pairs of legs which may be attached in any one of eight positions on either side, making it possible to direct the discharge in any one of the ways indicated in Figs. 3 and 4. The point of desirability in this arrangement, which will appeal to

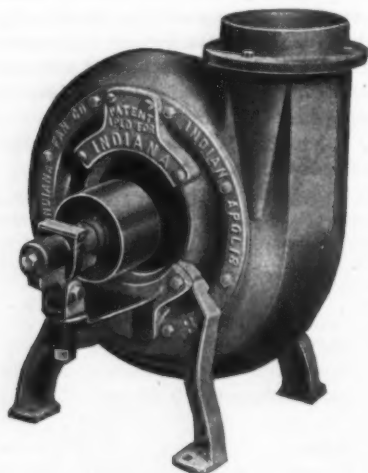


Fig. 1.—Left Hand Indiana Blower with Top Vertical Discharge.

a dealer handling the fan, would be his ability to meet the wants of customers at short notice without keeping in stock all the different forms which would otherwise be necessary. One of these blowers of each size makes a complete stock.

Another distinguishing feature of the blower is the self oiling, self aligning and dust protected bearings, these being provided with phosphor bronze bushes. Each pair of feet and a side plate form a single casting between which the shell of the blower is supported, being bolted to the plates with fibre gaskets between to form an air tight joint. The shell is cast in one piece. The bearings are supported in brackets bolted to the leg frames.

Fig. 1 shows an arrangement of the blower for left hand top vertical discharge, and Fig. 2 shows a view of the blower with the shell removed, exposing the fan. This

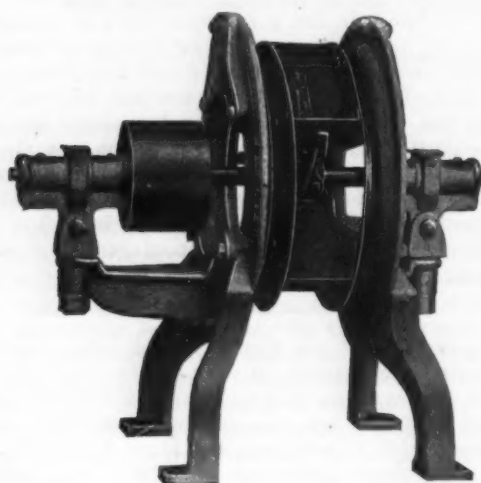


Fig. 2.—Volume Blower with Shell Removed.

type of blower, it is stated, is especially suited for blowing forges and furnaces and for forced draft for steam boilers, and it is also adapted for very many manufacturing processes.

The company also manufactures a volume exhauster which is essentially the same in external appearance, except that it has only one inlet while the blower has two.

In the case of the exhauster, the bearings are both on the closed side of the fan, so that the opposite open side may be provided with a flange for connecting to a system of piping. The fan of the exhauster is practically the same as the fan of the blower, except that the wings are of very much heavier steel to withstand the severe work required. The exhausters are used for conveying shavings, dust, &c., from wood working machines, abraded metal, dust, &c., from emery and buffing wheels, for removing smoke from forges, foul odors and vitiated air, gases, &c., from rooms and buildings.

The ability to set the discharge at any angle will nearly always make it possible to avoid one more angle in the piping than is usually possible. The spiders used in the wheels of these exhausters are of cast steel. The wings are made of sheet steel and are guaranteed to endure any class of service within the capacity of the fan. The wings are riveted to the spider and their flanges to a heavy steel band on each side of the wheel. The

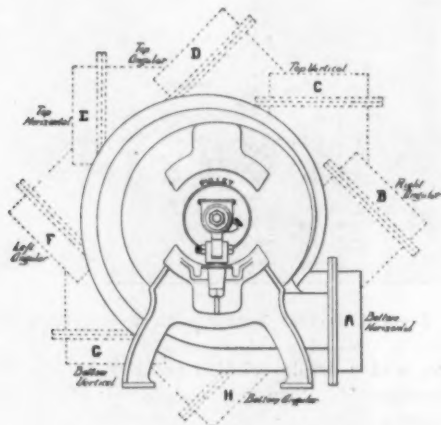


Fig. 3.—Diagram Illustrating the Possible Left Hand Positions.

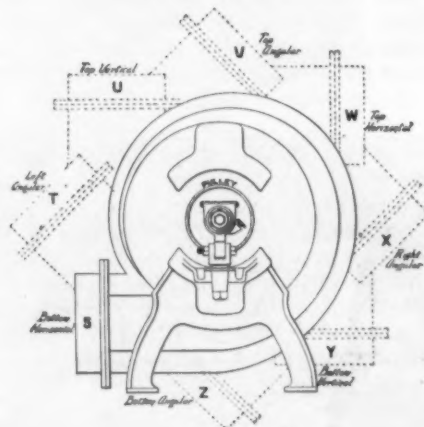


Fig. 4.—Diagram Illustrating the Possible Right Hand Positions.

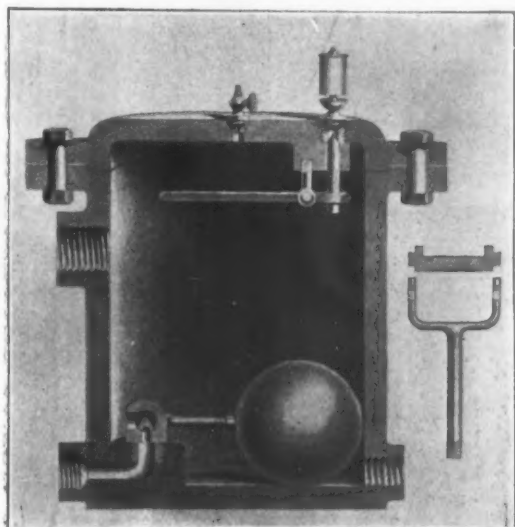
pulley and wheel are carefully balanced so that when running at high speeds there will be no drag or injurious wear on the bearings.

The box and bearing are of the same type that has been used on the Triumph exhaust and disk fans which have been made by this company for a number of years, hence their qualities have been thoroughly tested. The boxes are provided with an overflow and oiling device which indicates when oil is required and makes it impossible to overflow the box when filling the oil chamber. Oiling rings are provided in the centers of the bearings which will usually give notice by rattling when the oil in the chamber is running low. The outside ends of these boxes are closed with threaded plugs through which an adjusting screw passes and bears against a bronze end bearing provided for the end thrust of the shaft. The blowers and exhausters are arbitrarily termed right and left hand, according to the side the pulley is on, when looking toward the outlet in its bottom horizontal position. For instance, Fig. 3 shows the left hand and Fig.

4 the right hand arrangement. The blowers are made in four sizes with outlets from 3 to 7 inches in diameter, the smallest weighing 24 pounds and the largest 130. The exhausters are made in the same sizes with the exception of the smallest, and weigh from 58 to 132 pounds.

The Lindstrom Steam Trap.

One annoying source of trouble in steam traps using flat, pin or adjustable valves that lift from their seats is the tendency for grit or scale to collect on the valve seats, preventing them from closing tightly. This allows steam to escape and soon causes the seat and valve to be cut so that they have to be reground. Starting on the premise that if the Corliss type of valve is a good one for steam engines it ought also to be a satisfactory one for steam traps, John L. Lindstrom, Allentown, Pa., has designed the trap illustrated herewith. His principal



The Lindstrom Corliss Valve Steam Trap.

object, he states, was to produce a trap which was not only simple and effective but would operate automatically with an excessive flow of water under all pressures without the escape of steam.

The Lindstrom Corliss valve steam trap, as may be seen from the illustration, is of simple construction, and does not lift its valve from the seat, hence dirt cannot get between the valve and its seat. The box is of cast iron and contains, besides the valve and float, a safety alarm device. The valve chamber, which screws into the cored outlet at one side of the cast iron case near the bottom, is of bronze and is bored and ground to fit the liberating valve. This is a balanced valve having small wearing parts with consequently little friction. The ends of the valve on each side project beyond the valve seat and are squared to engage the forked arm carrying the copper ball float, as shown in the small detail. No pins or screws are used. The center of the valve being the fulcrum, the float has great lifting power for its size and does not need to be very large.

The water of condensation enters the trap through the inlet near the top, and as its level rises the float rises and moves the valve. When the valve has uncovered one-fourth of the port opening the water in the trap under ordinary conditions is easily cared for and there is still three-fourths of the opening in reserve to deal with emergencies.

The automatic alarm is to give warning if the trap ceases to discharge as it should, from an accumulation of mud in the outlet or other cause. It works if the water level rises above a certain height, as in that case the float comes in contact with the lever controlling the whistle valve and lets steam escape to blow the whistle. The removable cover of the trap is ground and no packing is required.

The Administration and Tariff Revision.

The following statement comes from an expert in customs matters, whose sources of information are of the best character:

Secretary of the Treasury Leslie M. Shaw has been in consultation with members of the Board of United States General Appraisers and other local customs officials during the last ten days on the much talked of revision of the tariff, and it is understood that he has been carrying out the wish of the President to learn the views of the men who have actually had the administration of the existing law and are presumed to be familiar with its strong and weak points. The General Appraisers in particular have accumulated a mass of information on the operation of the law, from both importers and domestic manufacturers, for there is hardly a case of importance that comes before them in which the testimony of the domestic dealers is not taken.

The impression gained by those with whom Mr. Shaw has talked and whom he has questioned is that the purpose of the Administration is to urge a piecemeal revision of the tariff, rather than to take up the whole question, by the framing and presentation of a new tariff bill covering all the schedules. The plan as indicated by Mr. Shaw seems to be to take one schedule at a time and consider it absolutely without reference to the law as a whole. The purpose of Mr. Shaw's inquiries was to learn the opinion of those with whom he talked as to the schedules for the revision of which there is the most insistent demand and which ones could be revised with the least disturbance to general business. It is argued by the advocates of the piecemeal plan that it will cause a minimum of disturbance to business conditions, and that whatever disturbance may thus be caused will be confined to one trade at a time.

So far the plan of the Administration seems to include the revision of the iron and steel schedule, the hide and leather schedule and the wool schedule, but hides and wool will probably come before iron and steel. The Administration regards the gubernatorial victory of W. L. Douglas in Massachusetts as due entirely to the dissatisfaction of the manufacturers and laborers of that commonwealth with the duty on raw material of their two leading industries, hides and wool. It is likely that the Administration will recommend that hides be placed on the free-list, as has been demanded by the manufacturers of shoes and other leather products for years, and that the duty on raw wool, if not removed altogether, will be very materially reduced. It seems to be generally conceded even by the stand pat protectionists, that the American farmer has derived no benefit from the duty on hides, and that the growing scarcity and increasing price of wool have rendered protection to the grower unnecessary, while the duty has laid a burden on the manufacturer of woolen goods.

The attitude of the Administration toward the duty on iron and steel is more complicated. It has been impressed by the popular outcry against the sale of American steel products cheaper abroad than at home, and there can be no doubt that the public at large places the blame for this condition on the tariff, which allows the exaction of higher prices at home. The fact that the trade is popularly supposed to be controlled by a trust has also a good deal to do with this feeling, and the Administration feels bound to take notice of this popular sentiment, while not wishing to do anything to injure a great industry. It may be said with certainty that while the Administration is very seriously considering a revision of the iron and steel schedules, a great deal more thought and inquiry will be given the subject before any conclusion is reached.

Up to November 30 the Bessemer & Lake Erie Railroad, owned by the Carnegie Steel Company, had hauled 4,379,179 net tons of ore. In 1902 4,685,045 tons of ore were hauled. If December shipments are as heavy as expected, the road will haul more ore this year than in any previous year in its history.

The American Electric & Controller Company Rheocrat.

The name of rheocrat was originally given to a current regulator for controlling the brilliancy of electric lights, the principal commercial application of which was its use as a theater dimmer or for obtaining effects in advertising signs. It was invented some three or four years ago by James P. Erie, but has since been adopted by Elmer A. Sperry for use as a motor controller for regulating the speed of direct current motors. The new machine has little resemblance to the earlier lamp dimmer, but has a greatly enhanced usefulness.

The controller operates on a principle which is a radical departure from all other methods of obtaining variable motor speeds. Instead of using resistance the voltage is altered by passing the current through an interrupter

starting box, circuit breaker or overload release, all of these actions being accomplished in the mechanism embodied in the controller itself.

In the accompanying illustrations is shown a view of the controller with the cover open showing the interior parts, and Fig. 2 gives a diagram of the wiring connections. At first thought the device may seem open to objection, since the interrupting of a circuit has a tendency to cause serious sparking, which would soon burn out the interrupter drum or brushes and destroy their uniform operation. This serious difficulty has been overcome by the use of choke coils, which cut down the sparking at the instant of breaking the circuit and are so effective that in actual running during long periods of time the apparatus has shown no injury or deterioration in the condition of the surfaces of the interrupter drum or brushes. The choke coils are carried on the disks,

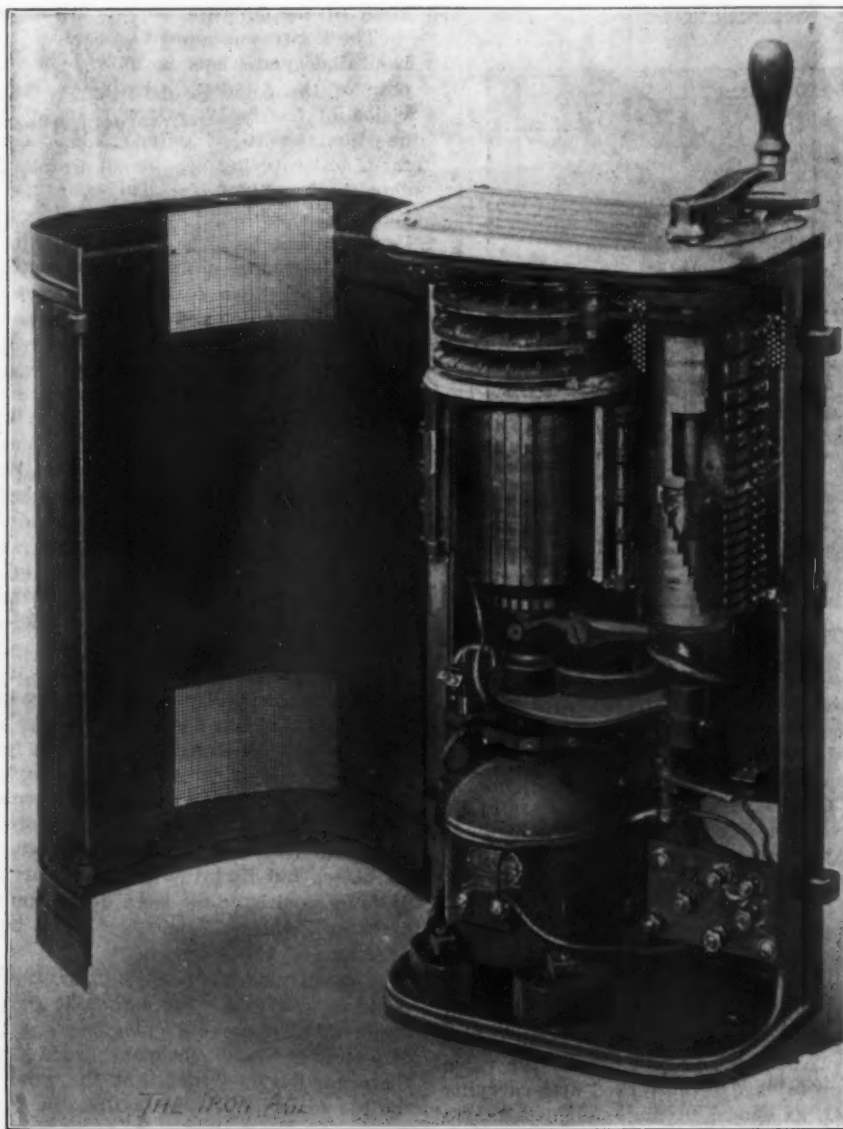


Fig. 1.—The Rheocrat with Cover Open.

in the form of a drum which resembles a commutator, except that its segments are not all of equal width. The drum is rotated at a high rate of speed by a direct connected small vertical motor contained within the controller, and the length of time that the circuit is closed during each revolution is variable and dependent upon the amount of surface of the drum that is in circuit. Varying the voltage impressed at the terminals of the motor is the only way in which variable speed can be obtained without altering the connections within the motor. With this controller, therefore, no modifications are required in the motor, and no special system of current supply wiring is necessary as in the multiple-voltage system. All parts of the equipment are standard right up to the controller. There is not even the necessity of a

which are mounted above the interrupter drum and on the same shaft with it.

The principal advantage of the controller is its ability to regulate speed with less waste of power than is possible by the use of resistance, and it is also claimed to be an improvement on armature or field regulation, inasmuch as the torque remains constant at all speeds. This is the important consideration, as it enables the same work to be done irrespective of speed. In the driving of machine tools it is obviously important that the machine shall be able to pull a given cut at a slow speed as well as a high speed, because a steel tool does not suffer so much from the size of the cut taken as it does from the speed at which it is operated. To obtain the greatest efficiency from a tool it is, then, desirable to

vary its speed with different diameters of work, so that the maximum speed which the tool will stand may always be maintained. It is this purpose which the controller is intended to serve. The fact that the speeds may be altered instantly without stopping the machine or losing time in the manipulation of mechanisms is the secret of its value.

Referring to Fig. 1, it will be seen that the controller to all outward appearances resembles the controllers we are accustomed to see. The handle at the top accomplishes, through the interior mechanism, all changes from no speed to full speed in one direction. The controller handle is connected with a cylinder which makes and breaks electrical contacts in the usual way. To reverse the motor it is simply necessary to move a small switch, shown under the controller handle, to its opposite position, when the entire speed range in the opposite

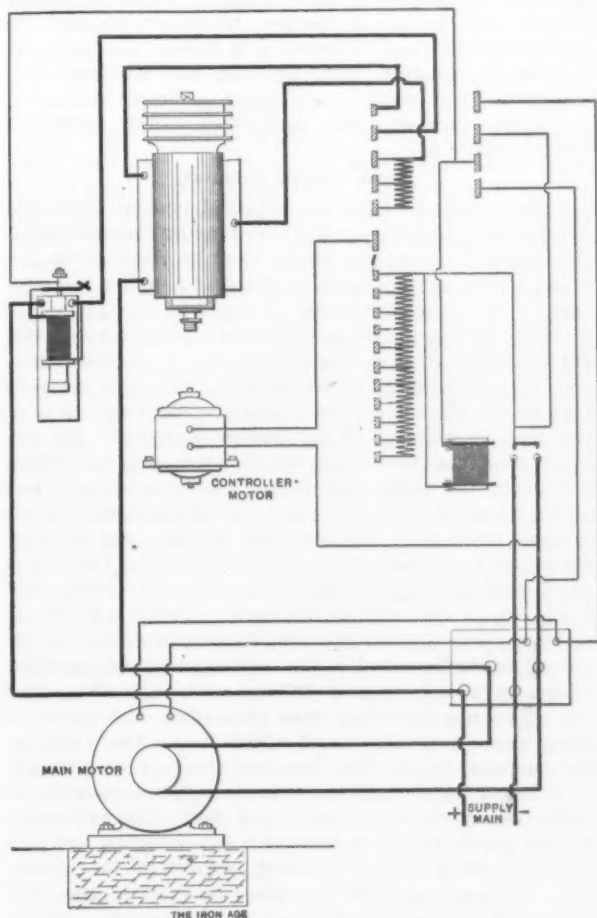


Fig. 2.—Wiring Diagram for the Rheocrat.

direction becomes available. The reversing switch is interlocked with the main controlling cylinder, so that it cannot be thrown except when the controller handle is at the off position.

The first movement of the handle closes the main circuit and at the same time closes a shunt circuit around the interrupter drum. This starts the main motor through the starting resistance shown diagrammatically in Fig. 3 to the right of the main controller fingers. Simultaneously the small motor within the controller is started, setting the interrupter drum in motion. This small motor is a series motor and requires no starting resistance. During this period the drum is quickly accelerated to a speed of about 1000 revolutions per minute. On the next step of the controller the shunt circuit around the interrupter is broken, the starting resistance is cut out and the current to the motor is caused to pass through the interrupter, which on the second step has its two large diametrically opposed segments active. Adjoining the large segments on the sides which recede from the brushes as the drum rotates are several smaller segments connected together and to the larger segments through the choke coils previously mentioned. These together form the first contact and permit the current

to be broken gradually, avoiding sparking. Continued movement of the controller handle connects two interrupter segments to the large ones on their advancing sides, thus increasing their breadth and the time during which current can pass to the motor during each revolution of the interrupter. And so on for the eight steps the live surface of the drum is increased until finally full pressure is given to the motor. At this point the interrupter is cut out and the small driving motor comes to rest, being started up again if the controller is brought back to one of the eight points in which the drum is required. Beyond the range afforded by the interrupter, a small amount of increase in speed is obtained by field weakening. If at any time the load of the motor exceeds that which it can easily carry, an overload release is tripped and current cut off entirely. The opening of this overload switch automatically locks the controller so that current cannot be put into the motor again without returning the handle to its off position. The overload release acts if the controller handle is moved too rapidly from its slow to its fast speeds, and so protects both the motor and controller from injury as a result of careless use.

The ratio of speeds obtained with the controllers is one to four for standard constant speed motors and one to six for motors with special wiring for variable speed. In special cases the range may even be extended to ten or twelve to one. Mechanically and electrically the controller is admirably designed throughout to adapt it to such severe handling as must be expected in the average machine shop. It is especially to be commended for its simple operation. The absence of outside switches or other devices requiring attention is a decided advantage. All the necessary actions being performed through the controller handle there is nothing left to the operator's intelligence, and an ordinary unskilled workman can be trusted to use it.

The rheocrat has already passed through a period of severe testing and has several times been modified until the form shown in the accompanying illustrations was evolved. It is made by the American Electric & Controller Company, 12 Dey street, New York City, of which J. D. Maguire is president and Elmer A. Sperry, consulting engineer.

The Standing of a Pro Forma Invoice in Determining Dutiable Values.—The Treasury Department on December 5 ordered Collector Stranahan of New York to file an appeal from the decision of the Board of United States General Appraisers, rendered a few days before, holding that the value declared in a *pro forma* invoice did not necessarily constitute the value on which the ad valorem duty of an importation must be based. The decision of the board was rendered on a protest by the Commercial Cable Company of New York against the action of the Collector in assessing duty on an importation of telegraph instruments on the basis of the value declared in a *pro forma* invoice. The goods were entered on a *pro forma* invoice before the arrival of the regular invoice at an estimated value of £342, but the consular invoice, which arrived later, placed the value at £315 3s. 1d. The Collector, however, insisted on liquidating the invoice on the basis of the value as entered under the *pro forma* invoice under the provision of the law which declares that the minimum value on which an importation shall be liquidated shall be the value as entered. The board held that the entered value under a *pro forma* invoice was only tentative, and made for the purpose of entry, and was always subject to amendment on the arrival of the regular invoice. The Department, however, takes the view that the action of the Collector was correct.

The Shenango Furnace Company, Frick Building, Pittsburgh, of which W. P. Snyder is president, has bought the Mabel Furnace, operated by Perkins & Co., Limited, at Sharpsville, Pa. The stack is 75 x 15½ feet and has an annual capacity of 75,000 tons. The acquisition of this stack gives the Shenango Furnace Company a total of four stacks at Sharpsville, with an annual capacity of 300,000 tons.

The Manufacture of Army Ordnance.

Output of Government Arsenals to Be Increased.

WASHINGTON, D. C., December 3, 1904.—Unusual significance attaches to the forthcoming annual report of Gen. William Crozier, chief of the Bureau of Ordnance of the War Department, owing to the special effort which is now being made to expand the facilities of the various arsenals so as to enable them to do a large part of the work heretofore performed under contract by private manufacturers. Nearly every Government establishment under the bureau has been enlarged during the past year, and machinery and tools are being installed capable of producing a much larger output than has heretofore been attempted. The ordnance work done under contract during the past year was let to 16 of the leading iron and steel manufacturing concerns of the country, but the tendency is to produce a constantly increasing proportion of ordnance material in the Government shops and under the immediate supervision of Government experts.

Test of Forgings.

During the past year some elaborate experiments were made by the bureau that are of special interest to iron and steel manufacturers. One series of tests in particular, undertaken to determine the presence of streaks in forgings, promises to prove of special value. General Crozier states that streaks as a rule are of little depth, and attempts to locate tangential test specimens in such a way that streaks could be subjected to test by tensile forces normal to their surfaces have been more or less unsatisfactory. By taking smooth cuts on the faces of rings streaks are revealed in cross section as lines of varying length up to $\frac{1}{2}$ inch or more, and, being of circumferential direction, radial specimens traverse the streaks in a favorable manner for test. The streaks thus appearing on the planed faces of the rings were numerous, not infrequently reaching five per square inch, but attempts to photograph them were unsuccessful. One piece of metal was planed to a thickness of 0.2 inch; a prominent streak was revealed and three radial specimens were taken across it. Several specimens fractured along the line of this streak, with a reduced elastic limit and tensile strength and very little elongation and contraction of area. It is true that the contraction and elongation of specimens taken at right angles to the direction in which the metal is principally drawn by forging are not expected to be so great as those characteristics in specimens taken with axes parallel to that direction; but the elongation and contraction of metal sound in the ingot should not be so reduced or affected in any direction by forging as to vary in metal forged in the same way by the same manufacturers from practically nothing to almost as much as shown by the best specimens taken with axes parallel to the direction in which the metal was drawn, nor should sound metal be so affected by proper forging as to lower its ductility in any direction far below that which should be displayed by ordinary steel castings. From a number of tests made upon metal received from abroad the results of the tests of the radial specimens were nearly equal to those of the tangential specimens. These records, while not numerous, serve to indicate that a defective radial specimen is not necessarily a natural consequence of forging steel.

It cannot be assumed that all streaks will be disposed with their surfaces concentric with the cross section of the forging—i. e., parallel to the principal stresses, which will act on a hoop or tube when assembled in a gun. It is quite probable that some of the numerous streaks will be so deflected that their surfaces will take an inclination spirally toward the axis, bringing them across the direction of the principal stresses and thereby menacing the strength of the forging.

The tensile tests now prescribed by the specifications show the physical qualities of the metal resulting from its carbon content and heat treatment, but only by chance do they reveal the presence of a defect. Tests having for their special object a revelation of defects impairing the strength and ductility of forgings as a whole below

what has been shown by the tensile test specimens are therefore necessary. It is possible that a mandrel test may be the means for determining the presence of such defects, and this test is under consideration. It is considered to be less expensive and more comprehensive than a requirement that as many small tensile specimens be tested as may be taken from the end of a forging.

Contractors on Ordnance Work.

The work performed for the Government by contract during the year was furnished by the Bethlehem Steel Works, the Reading Iron Works, the Rarig Engineering Company, the Morgan Engineering Company, the Mansfield Engineering Company, the Wellman-Seaver-Morgan Company, the Firth-Sterling Steel Company, the Warner & Swasey Company, the Crucible Steel Company of America, the Carnegie Steel Company, the Midvale Steel Works, the Detrick & Harvey Machine Company, the United States Rapid Fire Gun & Power Company, the American Ordnance Company and the Builders Iron Foundry. The material furnished included forgings of all kinds, finished guns, projectiles, rifles, cartridges, range finders, &c.

Rock Island Arsenal.

The facilities of the Rock Island arsenal have been greatly increased during the past year by the addition of 92 machines of various kinds, most of which were procured for the manufacture of new field artillery material. One of the most important changes in the process of manufacture during the year has been an extensive transfer from day to piece work, resulting in a reduction of cost varying from 20 to 60 per cent., although the earnings of the workmen have been increased from 15 to 30 per cent. as a result of the increased output. The machine shop has been operated 16 hours per day during practically the entire year, using two shifts of machinists and helpers. A hydraulic plant, consisting of a triplicate vertical pump and two hydraulic presses, has been installed and excellent results obtained in the forming of parts having irregular shapes out of flange steel. The machining of the interior of a recoil cylinder is a difficult and complicated operation, due to the comparatively inaccessible surfaces and to the accuracy of finish required. These surfaces have been finished with such nicety that the maximum variation from prescribed dimensions in many cases does not exceed 0.0008 inch. The axles for the carriage, limber and caisson are hollow, with the bore larger in the middle than at either end, and are made from a single piece of forged steel. The axles were at first purchased from private manufacturers, but as a result of the improved methods adopted at the arsenal they are now made for less than one-half of the price for which they were purchased in the market. An unsuccessful effort has been made to manufacture counter recoil springs for these carriages; experiments with that end in view will, however, be continued.

Springfield Armory.

At the Springfield armory 100 machines of various kinds, one electric generator and one 40 horse-power motor were purchased and installed, in addition to 17 machines manufactured at the armory. Interesting experiments have been conducted at this institution to devise a method of obviating the erosion of the bore of the new service rifle which is due to the chemical and mechanical action of the gases emerging from the cartridge shell at a high temperature and under a pressure of about 49,000 pounds per square inch. Tests are being made for the purpose of obtaining, if possible, a barrel steel which will more effectively resist this action of the powder gases. Experience so far shows that erosion increases with the percentage of carbon contained in the steel, and also in the case of nickel steel with the percentage of nickel. The erosion in barrels made of nickel steel is greater than in those made of simple carbon steel.

Frankford Arsenal.

At the Frankford arsenal 140 new machines have been added during the year, and a new power plant has been installed, furnishing power to all departments which are motor driven. The motors are connected to the shafts by Renold or Morse silent chains, and in some cases New

Process rawhide pinions with cast iron gears have been used. The group system of driving is employed in all departments excepting the carpenter shop, where each machine has its individual motor, belt connected.

Capt. Ormond M. Lissak, Ordnance Department, has continued to devote much time and attention to the designing of automatic machinery for use in the manufacture of small arms cartridges. As a result of his efforts a number of automatic machines have been perfected and installed which not only decrease the cost of manufacture, but also the amount of floor space required for a given output. Among the machines devised by him and installed during the year are the following: A machine which inserts the springs into the cartridge clips at a rate of 9000 per day and which performs the work of nine hand operators; a machine which inserts the cartridges into the clips and turns down the clip springs over the cartridges at a rate of 28,000 per day. It requires two operators, but does the work of five hand operators.

Watervliet Arsenal.

At the Watervliet arsenal new machines in the sea coast gun shop have been arranged with a view to the use of an electric motor drive throughout the shop. The more important machines have been equipped with individual motors, and the minor machines have been arranged so that one motor may drive a group. The method of power transmission heretofore used has been exceedingly inefficient. The system of electrical distribution, therefore, promises increased economy, light and cleanliness, and decreased danger of fire, breakdown and personal injury. The electrical equipment of the machines involves a consideration of the source of power for the purpose. The department has under consideration the supply of power from the Hudson River Electric Company in the form of alternating current.

Improvement in shop methods has been secured during the year, and the necessary changes are proceeding as rapidly as funds will permit; they have resulted in much economy and efficiency. Experiments are now under way with a view to grinding all shrinkage surfaces of gun forgings. This has for its chief object the elimination of faults in shrinkage work, but it is also believed that the work will be done more economically. The use of grinders has been otherwise considerably increased. Special attention has been given to the tool room department. Formerly each division of the gun shop made at least part of its tools, and working jigs were not in general use. A number of experienced tool makers have been secured and all work of this kind is being concentrated under one head. The increased use of working jigs has resulted in more accurate interchangeability of parts and generally in economy of labor. High speed cutting steels are now in general use and all new brands are being given a conscientious trial. The alloyed steel has made a great saving in the cost of roughing work, but the most valuable results have been obtained from the use of finished steels containing a high percentage of carbon with some tungsten. These not only permit of finishing at higher speeds, but hold their keen cutting edge for a long time. In keeping the plant modern and up to date 30 new machines have been introduced during the year.

Watertown Arsenal.

The difficulty experienced at the Watertown arsenal in previous years in promptly obtaining satisfactory steel castings of small and medium size for repairs and for new work continued to delay the completion of work in hand, and as the delay in obtaining small steel castings required for repairs of the armament resulted at times in serious embarrassment, a small steel casting plant, including a 2-ton converter, was installed and has been in use since March 25, 1904. Although a few additional parts are required to complete this plant, such as a sand blast for cleaning castings, a core room and oven, excellent results have been obtained from it. Prior to June 30, 1904, 70 heats were made, amounting to 140 tons. The castings and ingots have shown excellent physical qualities and appear to be sound.

The operations in the machine shop at the Watertown arsenal have been much hampered by the lack of the

proper facilities for handling large work. This will be shortly remedied for the larger machine tools and for the erecting shop by the installation of electrically driven traveling cranes, for which an appropriation is now available. The remedy provided for the erecting shop, however, is only partial, since the width of the building is so great and the walls are so weak that it is not possible to install therein a crane capable of handling a 12-inch gun. A proper system of hoists, trolleys and trolley beams, operated by compressed air or electricity, should be provided, and has been estimated for.

High speed tool steel has been used in the shops throughout the year. While the increased amount of metal removed by it compared with the old tool steel is very marked, the conditions existing in this shop are such that full advantage of this new steel cannot be secured. The width of the pulleys on the main line of shafting and countershafts, also on many of the machine tools, is not sufficient to permit the required power to be transmitted. The most suitable method of driving the larger machines is by the use of individual motors. The installation of the steel casting plant, of the miscellaneous motors throughout the shops, and the contemplated installation of new electric cranes will render it necessary in the near future to provide a larger source of electric power, at which time individual motors should be gradually applied to the larger machines.

The testing department of the arsenal has done considerable work of importance to manufacturers during the year: the examination of metal in streaked hoops has been continued, comprising hydrostatic tests of thin sections, mandrel tests on rings of the full thickness of the hoops from which they were taken, and tensile tests of the metal in both tangential and radial directions. Recognizing the general engineering interest which attached to the strength of concrete in plain and reinforced construction, the class of industrial tests carried on by the testing laboratory has included a number of concrete columns. These columns are of such proportions as to require considerable part of the capacity of the larger testing machine in carrying their tests to destruction and represent material in constructive sizes on engineering and architectural work. Tests to determine the endurance of metals subjected to alternating stresses under the conditions of rotating shafts transversely loaded have been continued. The results show that the number of rotations that can be made before rupture increases very rapidly as the ratio of the load applied to the tensile strength of the metal tested is decreased.

W. L. C.

A River Flushing Project in Connecticut.—The project to build large storage reservoirs on the upper waters of the Naugatuck River and the streams that make up the river is not for the purpose of developing power, it is given out, but is a philanthropic enterprise with a purpose of removing the nuisance occasioned by the emptying of sewage in the river. The city of Waterbury is in trouble regarding its sewage, which is emptied into the river, rendering it offensive at times. Two years ago it was suggested by prominent men of the Naugatuck Valley that storage reservoirs be created, so that sufficient water might be accumulated during flush times to clean out the river when it becomes low, thus enabling Waterbury and other towns and cities in the valley to continue to empty their sewage into the stream. Two years ago the Legislature of Connecticut was asked to give a charter to enable these gentlemen to associate together and procure the necessary surveys to determine if the project is feasible, but the charter was denied because the necessary 60 days' notice in the newspapers had not been given. Such notice has now been given, and the matter will again come before the Legislature when it assembles this winter. If the charter is granted nothing will be done for a considerable time excepting to make the necessary surveys and investigations. The gentlemen interested are Charles F. Brooker and Franklin Farrell, Ansonia; John H. Whittemore and George A. Lewis, Naugatuck, and David S. Plume, Edward L. Frisbie, Jr., and Edward O. Goss, Waterbury.

Condensers for Steam Turbines.*

There appear to be three accepted designs for turbine condenser systems: The combination consisting of a surface condenser, a centrifugal hot well pump, an air cooler, a single cylinder dry vacuum pump, a centrifugal circulating water pump, together with their connecting and drip piping and valves; the foregoing arrangement varied by omitting the hot well pump and also the air cooler and dry vacuum pump, substituting the wet vacuum pump, and a system like the first, except that an elevated jet condenser with barometric tube and hot well take the place of the surface condenser and hot well pump. The cost per kilowatt is about the same—\$7 to \$10—for either of the first two systems, while the third type may take up less floor space, and costs but \$5 to \$6 per kilowatt. The dry vacuum pump used with barometric condensers must have a two-cylinder air pump, and the exhaust steam from the turbine cannot be used again in the boilers. There is, besides, a fourth type of condenser which may be used with steam turbines and to which it is the object of this paper to direct attention; namely, the injector or ejector condenser.

Within the past year the Atlantic Mills, Providence, R. I., has installed a 400-kw. Westinghouse-Parsons turbine. A vacuum of 28 to 28½ inches is maintained by means of the following condenser system: The exhaust steam is led, through 20 feet of vertical 16-inch cast iron pipe and three short turn elbows, into a 16-inch Bulkley injector condenser. The level of the ground floor is 34 feet below the condenser bulb, while the turbine lies on a concrete-steel floor, the level of which is 12 feet 6 inches above the ground floor.

The injection water comes 500 feet from the river to the power house, under a slight head—perhaps 3 feet—depending upon the state of the river. A 6-inch belt driven Lawrence centrifugal pump elevates the water into a vertical tank, 30 inches by 15 feet deep. The level of the water in this tank is maintained by the waste pipe 6 inches below the water inlet nozzle on the condenser. From near the bottom of this vertical tank a 7-inch injection pipe rises up to the condenser.

A good deal of air along with the water is pumped into the top of the tank by the centrifugal pump, but apparently the depth of the tank acts efficiently as an air separator, and no air in the form of bubbles passes over into the condenser. At any rate, the vacuum shown by the mercury column is 28½ inches. The remarkable thing is that this is so whether the column be attached to the bulb of the condenser or to the exhaust chest of the turbine, proving the absence of friction in the exhaust pipe. Not only is a 16-inch exhaust pipe thus proved ample and more than ample in size for a 400-kw. turbine, but the vacuum obtainable with this condenser is substantially the same, whether steam is passing through the turbine or not. The falling of the water through the "throat" is the air pump, and is the only air pump needed.

It may be of interest to relate here a rather unusual experience encountered when this 16-inch condenser was first put into service. It was convenient to have the injection pipe rise on that side of the 16-inch exhaust pipe farthest from the condenser. At the top a 45-degree bend connected to a long radius elbow enabled the pipe to turn and pass the exhaust pipe, approaching the condenser horizontally instead of vertically as in the usual case. Upon starting up the turbine only 22 inches of vacuum could be obtained, although the piping was absolutely tight. Finally, at a suggestion that the injection pipe should approach the condenser vertically rather than horizontally for the best results, a rearrangement of the injection piping was made, permitting this vertical approach. At once, upon starting up the turbine, the result was 28½ inches of vacuum, and this has been maintained without interruption since. With the present load—about 300 kw. to 350 kw.—the 7-inch injection valve is open only a few turns, the temperature of the hot well is from 80 to 90 degrees, and water

enough can be passed through this condenser to maintain the vacuum in summer weather. The highest degree of vacuum thus far recorded, as measured in the turbine exhaust chamber, is 28¾ inches, the lowest 27½ inches. The variation is caused partly by changes in the barometer, but more by variable leakages in drip-valve seats. Perhaps also the amount of air entrained by the injection water varies from time to time.

If water is not to be had in abundance, the best way is to have two pumps, one of which returns to the condenser water taken from the hot well. In this way the highest theoretical temperature of the hot well water may be reached. It takes 10 horse-power to supply water by means of the centrifugal pump in sufficient quantity to condense 400 kw. of steam.

The method of sealing the spindle of the Parsons turbine against air leak where it passes out to its journals from the low pressure chambers—namely, by pumping water with centrifugal pumps formed in small recesses in the shaft cover, so as to keep a water pressure in these recesses in excess of that of the atmosphere—is a perfect success, as the experience with this condenser shows.

It is interesting to note our experience that no drip pipe or drip pump, for removing the water of condensation or the leakage into the exhaust chamber from these air seals, is found to be necessary or desirable. It is, indeed, necessary to exclude any accumulation of water in the exhaust pipe for fear that it will sway back and forth until it flushes up on to the large low pressure blades of the turbine. Running as they do at a very high velocity, sudden contact with water from the exhaust pipe will strip the last row off clean if such contact is permitted. Any further damage, however, to the other rotating blades seems to be prevented by the presence of the fixed row, which divide up the water into small streams. The rate of accumulation of water leaking by the small centrifugal air seal pumps into the exhaust pipe may be any amount up to over 950 pounds an hour. If, however, there is the least external load on the turbine, the flow of the steam up the exhaust pipe has the power to sweep the exhaust chamber dry.

The method of starting the turbine at the Atlantic Mills is to first turn on the injection water. Then admit steam to the turbine without admitting water to the air seals. After the load begins to come on, as shown by the ampere meter, the drip pipe from the exhaust chamber to the atmosphere, which has been open all night and up to this time, is now closed, the water turned on to the air seals, and the vacuum immediately draws down to 28 inches. It is not found absolutely necessary to start in this way, as the turbine can be run hours before the water accumulates in quantity. The object is simply to drain the turbine up to the moment when the load begins to come on. If the load is a "jumping" one, from nothing to full load, there is no danger of water accumulation. There is no exhaust steam "entrainer," or water trap or seal, provided at the Atlantic Mills turbine.

The injector condenser costs, fully installed, with centrifugal circulating water pump, tank piping and valves, from \$2 to \$2.50 per kilowatt. This cost is much reduced if there is a natural head of water available. At the installation described the condenser, two elbows, one tee, 18 feet of cast iron exhaust pipe and a 14-inch automatic relief valve cost, erected, \$591.50. It occupies practically no room.

Theoretically considered, in its relation to turbines, the injector condenser would seem to bar out all other condenser systems in those situations where the water used in the boilers is pure in its natural state. Where it is absolutely essential to save the water of condensation for re-use as boiler feed water, it pays to use one of the surface condenser systems. If the city water is pure and costs about 7 cents per 1000 gallons, water enough for a 400-kw. machine at 100 per cent. load factor would cost per factory year of 310 days, 10 hours a day, at 1000 gallons per hour, about \$217. With interest at 5 per cent. and fixed charges at 8 per cent., this sum warrants the capital expenditure of not to exceed \$1670. It is thus clear that it does not pay to buy the surface condenser

* Abstract of a paper by George I. Rockwood, presented at the New York meeting, December, 1904, of the American Society of Mechanical Engineers.

system simply to save the cost of paying city rates for boiler feed water.

The Atlantic Mills turbine is, so far as the writer knows, the only instance on record of the use of injector condensers for large turbines either of the Parsons or Curtis type.

Lake Iron Mining Matters.

Season Shipments by Large Ore Mines.

DULUTH, MINN., December 3, 1904.—Shipments from most of the large properties of the Lake Superior region for the season can now be given, and many are as below, in round figures. From a few there is still some ore to be shipped. Escanaba will move possibly 40,000 tons more, Duluth about 50,000 tons more, and a trifle from Ashland, Two Harbors and Marquette. Therefore exact totals cannot be made out for some time. There never has been a year in which the fall shipments were so large and the demand so good clear to the close as in this, and there has not been any previous year in which the weather has so assisted late shippers. Often it has occurred that for weeks steaming of ore has been necessary before it could be thawed sufficiently to run from cars to dock pockets or from pockets to ships. In either case the cost of handling ore is multiplied many times and the capacity of docks is very much reduced. There has been none of that this fall. Shipments of many of the leading mines have been as follows: Stevenson, 1,650,000 gross tons; Fayal, 900,000; Mahoning, 707,000; Adams, 511,000; Spruce, 452,000; Clark, 135,000; Chisholm, 56,000; Burtpool, 1,150,000; Mountain Iron, 1,130,000; Sellers, 207,000; Lincoln, 154,000; Grant, 54,000; Missabe Mountain, 4,500; Shenango, 52,000; St. Clair, 27,000; Glen, 280,000; Hull, 50,500; Higgins, 35,500; Rust, 211,500; Minorca, 122,000; Corsica, 30,000; Malta, 67,000; Sparta, 60,000; Elba, 127,000; Albany, 152,000; Utica, 120,000; Troy, 12,700; Mikado, 25,000; Cary, 62,000; Hemlock, 135,000; Baltic, 152,000; Jordan, 180,000; Corrigan mines at Crystal Falls, 515,000; Florence, 140,000.

Total season shipments of the Mesaba and Vermillion ranges will foot up almost exactly 14,600,000 gross tons, of which the Duluth, Missabe & Northern will lead with 5,400,000 tons, the Duluth & Iron Range will follow with 5,200,000, and the Great Northern will come next with 4,000,000. The Chicago & Northwestern road has handled about 3,010,000 tons to its Escanaba docks, which is about 67 per cent. of its business there last year. This represents its business from both the Menominee and Marquette ranges, but is not all of the ore shipments from either, and is a decided minority of those from the latter. The actual decrease in business from all Menominee mines for the year will prove to have been about 600,000 tons. Many of the mines that did not produce so heavily as a year ago have done a large amount of stock pile shipment. Especially is this the case at Chapin, Aragon, Penn group, Florence, Pewabic and the Corrigan group.

New Developments.

In reference to the sandy ores of the western Mesaba, written of at considerable length last spring, I stated that the Oliver Iron Mining Company had taken an option on the Areturus mine there and was exploring it. This option has now been closed and the property is taken over under lease. This calls for a royalty of 25 cents a ton on all ore shipped, but not necessarily on all mined, for this ore must be washed and dressed before shipment. The property is a large one, containing not less than 12,000,000 tons and perhaps much more, though it has been explored so many times and by so many interests that the facts are pretty well established. There is a considerable tonnage that does not require dressing, but is rich enough to ship. The history of this property is a long and varied one; it has been explored and abandoned by half a dozen concerns.

Pickands, Mather & Co. have been preparing plans for an extensive increase of operations the coming year, and will doubtless mine far more than the 1,143,000 tons they produced this year. Most of their stocks have been shipped, though they hold 80,000 tons at one Menominee

property. On the Mesaba range they will open their new Syracuse, a property just secured, in section 6-58-15, containing a body of excellent ore. A drop shaft will be sunk, and considerable difficulty is looked for in the job, for if there is any point on the Mesaba where water can be confidently expected it is at this property. There may also be quicksands and boulders. Their other Mesaba properties are in good shape for an enlarged production and can be relied on for any output the company may probably require. On the Menominee the firm has plans that call for a considerable expenditure. Gates centrifugal crushers are being installed, at the Vivian a No. 7½, and at the Baltic a No. 8, both very large and powerful crushers. Caspian is to be unwatered and reopened for mining on a considerable scale. Both Hemlock and Baltic will be sunk another lift and developed for mining on the new levels. Both these mines produced heavily this year. On the Gogebic range the firm has reopened Mikado mine recently, and will push its development, and is pumping out the Cary, so that mining and exploration can begin there shortly. It is probable that Pickands, Mather & Co.'s mine operations for the coming year will mean an output of at least 1,500,000 tons.

E. F. Bradt, who has been manager of the Leonard mine, Mesaba range, has become interested in a rock salt mining proposition in Detroit, Mich., and has let a contract to the Wallace Contracting Company, Duluth, to sink a three-compartment shaft 900 feet for rock salt. This shaft will ultimately be put much deeper, but not for the present. The company will be able to mine and hoist from this shaft from 300,000 to 400,000 tons a year, making it one of the very important propositions of that kind. With Mr. Bradt are a number of leading men of the Michigan salt industry.

Manufacturing Notes.

The Boyne City, Mich., charcoal furnace is to go into blast at once. It is the old St. Ignace stack, removed, enlarged and remodeled, and will make about 50 tons daily of charcoal iron. The fuel comes from the Boyne City Chemical Company, which is a subsidiary plant to a number of lumbering concerns in that region, and the ore is from Ishpeming. Fred Smith, formerly manager of the Carp Furnace, and before that of the Excelsior, is to be manager.

The 150-ton charcoal furnace of the Lake Superior Company at the Sault is being prepared for operations and will go into blast some time between now and spring. This is the second of the company's blast furnaces. No. 1, which is a 250-ton coke, is in successful operation, and is making about its capacity. It has had, so I am reliably informed, not a single accident or delay of importance since blowing in, and the product is very successful. It uses Forest, Sparta and some other Mesaba ores, and Negaunee, Breitung and some other Negaunees. The company's steel rail mill is making an average of 500 tons of rails daily, and has recently received additional orders of considerable size. The Canadian duties, bounty and "dumping clause" combined, are giving this company a protection of \$12.75, which includes duty \$7, bounty on steel made in Canada \$2.25, and additional bounty against dumping half the regular duty, or \$3.50. A plant that cannot make money under such a protection really has no business at work, and it is said that the Soo works is doing very satisfactorily at a price for rails considerably below the maximum that would be possible under this arrangement. The company is operating its wood pulp mill at the rate of about 100 tons of product daily, and is said to be doing so at a large profit, probably about \$600 daily. Its saw and other wood working mills and its sulphite mill are not running, for they were kept short of supplies to such an extent that they ran entirely out some time ago. The saw mill cut 12,000,000 feet during the year, and large crews of men are in the woods along the company's railway getting out timber for this and the remaining wood working mills. All of them will resume in a short time. The prospects of the company are said to be better than since its early days, and those interested in the development of the Northwest are glad to note the fact. D. E. W.

Port Henry Furnace Records.

The Achievements of an Early American Iron-master.

In connection with the obituary of the late Wallace T. Foote, published in *The Iron Age* for November 3, the fact was noted that under his superintendency of the blast furnaces of the Port Henry Furnace Company, now owned by Witherbee, Sherman & Co., at Port Henry, N. Y., which began over 50 years ago, remarkable results were attained. American furnace managers have accomplished such achievements in recent years in increasing the output of single stacks and reducing fuel consumption that we are apt to believe that good furnace practice is distinctively a modern development. It is due to the memory of Mr. Foote that some of the results which he accomplished long before the days of fire brick stoves, Connellsville coke and rich Lake Superior ores should be made a matter of public record. A year ago it was the pleasure of the editor to meet Mr. Foote at his home in Port Henry and to look over with him the cost sheets of the Port Henry furnaces recorded while under his management. Through the courtesy of his son, Wallace T. Foote, Jr., the present capable superintendent of these furnaces, we have been given access to the records and are thus enabled to present some figures relative to old time labor cost and fuel consumption which are not only interesting but which we believe will be somewhat surprising to the present generation of furnace managers.

These records begin with 1855, when the furnace plant consisted of two small stacks, equipped with iron stoves and operated exclusively with Pennsylvania anthracite coal as fuel. One of these stacks was built of stone, while the other, completed in 1854, was the first in the world to have an iron shell. They were 46 feet high by 15 to 16 feet in bosh diameter. The ore, then as now, was obtained from the contiguous mines of Witherbee, Sherman & Co. The total product of these two stacks for the fiscal year ending June 30, 1855, was 4546 gross tons of pig iron. The average cost per ton of iron was \$18.76, made up of the following items:

Coal	\$8.89	Tools .....	.18
Ore	2.52	Oil, shovels, &c. ....	.15
Limestone .....	.20	Repairs	1.00
Labor	3.55	General expenses.	1.65
Smith shop .....	.27		
Fire brick, &c. ....	.35	Total	\$18.76

The record for the year thus given does not state the quantities of raw materials used, but a subsequent report for No. 1 furnace, covering July, August and September, 1855, when the average cost of the product had been reduced to \$12.59, puts the fuel consumption at 2839 pounds of anthracite coal. In these three months the average cost per ton of labor and all other charges outside of coal, ore and flux was only \$2.50. The ore cost \$2.31 and the limestone 18 cents per ton of iron. The quantity of pig iron made was 1262 gross tons, or slightly under 14 tons daily.

Following are detailed costs per ton of pig iron for a number of succeeding fiscal years, ending usually about July 1:

	1856.	1857.	1858.	1859.	1860.	1861.
Coal	\$9.04	\$9.04	\$8.90	\$8.39	\$6.47	\$6.79
Ore	2.59	2.79	3.44	3.03	2.95	3.20
Limestone .....	.19	.17	.10	.09	.10	.10
Labor	2.35	2.22	1.85	1.54	1.72	1.57
Repairs	1.44	.79	.92	.52	.64	.72
Shovels and oil. ....	.08	.08	.07	.05	.05	.05
Cash items. ....	.21	.14	.15	.12	.07	.09
General expense.	1.36	1.09	.94	.89	.70	.60
Totals	\$17.26	\$16.32	\$16.37	\$12.63	\$12.70	\$13.12

Pig iron made, gross tons	8,305	10,825	9,038	13,822	10,376	13,653
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At various times during the period above covered some very interesting records were made by one or the other of these two furnaces. For the four weeks ending October 30, 1858, No. 2 furnace made 800 tons of iron at an average cost of \$11.49, on a coal consumption of 3071 pounds, costing \$6.85, but the labor cost was only \$1.05, which is especially noteworthy. For the year ending July 2, 1859, the labor cost for No. 2 furnace was \$1.38

on a daily average product of 23 tons 17 cwt. of pig iron. The lowest cost at which pig iron was turned out was by No. 1 furnace for the five weeks ending December 29, 1860, when the various items totaled only \$10.74 per ton, distributed as follows:

Coal	\$6.11	Shovels and oil. ....	.05
Ore	2.89	Cash items, &c. ....	.03
Limestone .....	.10		
Labor	1.54	Total	\$10.74
Repairs .....	.02		

It is interesting to note that all the furnace records up to the 70's showed from 2 to 5 cwt. of clay used per ton of iron made. Wallace T. Foote, Jr., states that it was used as a supposed flux, in the form of a grout in which the ore was mixed.

We do not have the records for 1862 and 1863. The record for 1864 shows a third furnace added to the plant, the product for that year being made by three stacks, but No. 1 furnace then disappeared from the tables, and from 1865 the figures cover only the operations of Nos. 2 and 3. The higher level of costs caused by the Civil War is shown from this time. Following are details of cost from 1864 forward:

	1864.	1865.	1867.*	1869.	1870.	1872.
Coal	\$12.99	\$16.26	\$15.90	\$10.51	\$10.94	\$9.28
Ore	5.09	5.89	6.98	7.45	4.90	7.91
Limestone .....	.26	.28	.22	.29	.27	.37
Labor	2.92	3.81	3.16	2.64	2.57	2.66
Repairs	1.27	1.88	.20	2.92	1.57	.82
Shovels and oil. ....	.07	.11	.10	.17	.07	.08
Cash items. ....	.23	.18	.19	.13	.26	.51
General expense. ....	.28	.50	1.56	1.92	2.35	2.14
Totals	\$23.11	\$28.91	\$28.31	\$26.03	\$22.93	\$23.77

Pig iron made, gross tons	15,867	9,280	13,148	11,482	18,961	16,511
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* In the record for 1867 appears an item of 14 cents per ton for "United States tax on iron," an internal revenue tax then being charged. It is doubtless included in "general expense" in subsequent years until abrogated, and it has therefore been added to that item in the above table.

	1873.	1874.	1875.	1878.	1879.	1880.	1882.
Coal	\$8.65	\$11.56	\$9.09	\$5.61	\$6.24	\$7.21	\$8.81
Ore	7.35	9.25	8.37	6.45	4.68	6.20	7.35
Limestone .....	.39	.38	.28	.37	.34	.43	.42
Labor	2.88	2.98	2.41	1.73	2.13	1.86	1.85
Repairs	1.31	1.53	1.22	....	.16	1.46	.74
Shovels and oil. ....	.09	.09	.08	.06	.04	.06	.05
Cash items. ....	.32	.13	.18	.22	.15	.21	.19
General expenses	1.83	2.64	1.10	.44	.67	.55	.47
Totals	\$22.82	\$28.56	\$22.73	\$14.88	\$14.41	\$17.98	\$19.88

Pig iron made, gross tons	18,920	14,740	15,011	13,974	12,846	19,238	21,421
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Included in the period covered by the foregoing tables are some special records worthy of separate presentation. Following is a record of low fuel consumption by No. 3 furnace for the five weeks ending January 2, 1869:

	Total quantity.	Total cost.	Average cost per ton iron.
	Tons. Cwt.		Tons. Cwt. Iron.
Coal	1,212 10	\$8,487.50	1 2 \$7.99
Cheever ore.	1,416 17	5,667.52	.. ..
Barton ore.	301 0	1,204.10	1 14 7.18
Hematite ore.	88 5	750.13	.. ..
Limestone	403 19	201.98	.. 7 .19
Scrap	10 0	....	21 pounds.
Labor .....	.. ..	2,220.77	.. .. 2.10
Repairs .....	.. ..	48.55	.. .. .04
Cash items. ....	.. ..	441.72	.. .. .41
Shovels and oil. ....	.. ..	45.80	.. .. .04
Totals .....	.. ..	\$19,068.07	.. .. \$17.95

Iron made: No. 1, 73 gross tons; No. 2, 255 tons; No. 3, 472 tons; white, 103 tons; mottled, 159 tons; total, 1062 tons.

Another excellent record was that made by the same furnace for the month of five weeks ending July 2, 1870, as follows:

	Total quantity.	Total cost.	Average cost per ton iron.
	Tons. Cwt.		Tons. Cwt. Iron.
Coal at \$7.	1,114 5	\$7,800.00	1 3 \$8.08
Cheever ore at \$4 ..	1,303 2	6,255.00	1 12 6.48
Barton ore.	260 12	....	.. ..
Limestone at 75 cents	353 12	265.20	.. 7 .28
Scrap	6 8	....	15 pounds.

Labor	2,102.07	.. ..	2.18
Cash items.....	459.26	.. ..	.47
Shovels and oil.....	86.10	.. ..	.09
Totals	\$16,967.63	.. ..	\$17.58

Iron made: No. 2, 98 gross tons; No. 3, 461 tons; white, 110 tons; mottled, 296 tons; total, 965 tons.

For a long run, the following figures, also for the same furnace, for a blast of 123 weeks ending August 23, 1871, are noteworthy:

	Total quantity.		Total cost.	Average cost per ton iron.	
	Tons.	Cwt.		Tons.	Cwt.
Coal	28,021	17	\$215,821.27	1	4
Coal to boilers.....	535	6	3,889.36	..	..
Cheever ore.....	24,337	18	136,245.56	1	12
Barton ore.....	8,158	12		..	..
Hematite ore.....	217	17		..	..
Smith ore.....	4,193	17	..	..	..
Limestone	8,935	18	6,847.18	..	7
Scrap	195	16	..	19 pounds.	..
General expense.....	..	..	39,555.43	..	..
Labor .....	..	..	59,044.30	..	..
Repairs .....	..	..	17,275.34	..	..
Cash items.....	..	..	4,960.89	..	..
Shovels and oil.....	..	..	1,870.30	..	..
Totals .....	..	..	\$485,509.63	..	..

Iron made: No. 1, 553 gross tons; No. 2, 4180 tons; No. 3, 12,217 tons; white, 1418 tons; mottled, 4478 tons; total, 22,846 tons.

The best record for low fuel consumption, however, and which is believed to have been the first time that pig iron was produced with a fuel consumption of "pound for pound" in this country, if not in the world, is presented in the following cost sheet of No. 3 furnace for the four weeks ending April 27, 1872, running exclusively on anthracite coal:

	Total quantity.		Total cost.	Average cost per ton iron.	
	Tons.	Cwt.		Tons.	Cwt.
Coal	1,134	7	\$7,940.63	1	0
Coal to boilers.....	8*	0	56.25	..	..
Cheever ore.....	1,047	16	7,072.80	1	8
Smith ore.....	261	19		..	..
Barton ore.....	261	19		..	..
Limestone	415	18	312.00	..	7
Scrap	37	10	..	..	..
Labor .....	..	..	2,167.75	..	..
Cash items.....	..	..	340.60	..	..
Shovels and oil.....	..	..	66.65	..	..
Totals .....	..	..	\$17,956.68	..	..

Iron made: No. 2, 314 gross tons; No. 3, 411 tons; white, 125 tons; mottled, 238 tons; total, 1088 tons.

Coke first began to be used as a mixture with anthracite coal in these blast furnaces in 1880.

The Operation of the Bankruptcy Law.

WASHINGTON, D. C., December 6, 1904.—The annual report on the practical operation of the Federal bankruptcy law has just been submitted to the Attorney-General by E. C. Brandenburg, the bankruptcy expert for the Department of Justice. The report shows conclusively that the law is operating to the advantage of the business community and it also reflects the general prosperity throughout the country. Through the courtesy of the Attorney-General, the correspondent of *The Iron Age* is enabled to submit the following abstract of this interesting document:

Voluntary Cases.

The grand total of petitions in bankruptcy filed in voluntary cases during the year ended September 30, 1904, is 13,784. This number is 500 less than for the year 1903, 2500 less than 1902 and more than 6000 less than 1899, the first year during which the law was in operation. The States showing the largest number of cases filed during the past year are as follows: Illinois, 1458; New York, 1443; Alabama, 1295; Massachusetts, 1124; Maine, 676; Ohio, 602. In the report for 1903 Alabama returned the greatest number of petitions, having a total of 1797, New York was second with 1546, Illinois third with 1437, Massachusetts fourth with 1238 and Maine fifth with 703. In the case of each of these States the number of petitions filed is considerably less than for the preceding year, with the exception of Illinois, which

shows an increase of 19 petitions over those filed for the year 1903.

Adjudications were made in all the voluntary cases filed during the year, except in 683 in which the petitions were dismissed. The discharge of bankrupts was refused in 77 cases, while in 165 cases compositions were entered into by the bankrupts with their creditors and confirmed by the courts. The total net assets realized in 11,024 cases were \$9,481,668, while the liabilities involved therein were \$87,330,113. In 197 cases the liabilities were less than \$100, in 1531 cases between \$100 and \$500, in 1689 cases between \$500 and \$1000, in 4302 cases between \$1000 and \$5000, in 1241 cases between \$5000 and \$10,000, in 1747 cases between \$10,000 and \$20,000 and in 728 cases more than \$20,000. In 4470 cases the petitions failed to schedule any assets, while in 4439 cases the assets scheduled were less than \$500 each. Of those filing voluntary petitions 880 were engaged in farming, 5291 were wage earners, 3381 were merchants, 283 were manufacturers, 193 were engaged in some profession and 996 were employed in various pursuits.

Involuntary Cases.

During the year 3298 involuntary petitions were filed to have insolvents adjudged bankrupt, but of these 416 petitions were dismissed because the court had no jurisdiction or because no act of bankruptcy had been committed. Compositions were made and confirmed in 140 cases. In 1311 involuntary cases closed during the year the assets scheduled were \$6,701,572, while the liabilities were \$28,297,114. In 207 cases no assets were scheduled, while in 185 cases the assets were less than \$500, the remainder exceeding that amount. Of those against whom petitions were filed during the year 883 were merchants, 125 manufacturers, 18 professional men and 156 persons engaged in miscellaneous occupations.

While it is impossible to state with accuracy the exact amount of fees charged during the past year in the administration of the bankruptcy law, yet as such fees are limited by the statute a careful examination of the reports of clerks and referees leads to the conclusion that they are much less than they were formerly in the insolvency proceedings brought under the various State laws.

Operation of the Law.

In discussing the practical operation of the law as indicated by these fees, Mr. Brandenburg says:

The report for the past year shows a gratifying decrease in the number of voluntary petitions in bankruptcy. This decrease may be ascribed, first, to the present era of business prosperity; and, second, to the further fact that for the first few years after the enactment of the Federal bankruptcy law a large number of persons who were insolvent, many of whom had been adjudged so under the State laws, took advantage of the Federal law. As foreshadowed in the reports on the practical operation of the law for the year 1900, the decrease in the number of petitions is very material, showing a decline of more than 6000 petitions since 1900. There is, however, a considerable increase in the number of involuntary petitions filed. This is to be expected, and is largely due to the fact that the legal profession is becoming more familiar with the involuntary features of the Federal statute, and is now taking advantage of its provisions, instead of proceeding under the State insolvent laws; in fact, in some isolated districts proceedings in cases of insolvency are now almost invariably instituted in the Federal courts under the Federal bankruptcy law.

The act of February 5, 1903, amending the act of July 1, 1898, establishing a uniform system of bankruptcy throughout the United States, enacted in pursuance of an almost universal demand of the bar as well as of the commercial interests of the United States, has now been in operation sufficiently long to demonstrate its real value. The operation of the law, as amended by the Ray bill, has almost entirely disarmed criticism, and except in occasional instances of persons who have some individual grievance complaint has practically ceased.

Creditors Must Enforce the Law.

The principal difficulty that has arisen in the practical operation of the Federal insolvency law is due to the fact that creditors have filed their claims directly with the referees and have relied entirely upon those officers to protect their interests. This is a practice which cannot be too severely condemned. If insolvents begin to realize that failure on their part to schedule any assets will result either in their creditors failing to prove claims against them, or in their sending them directly to the referees, instead of retaining counsel to protect their interests, it will soon come about that dishonest debtors will evade the provisions of the law. It is only through an intelligent and

careful examination of a bankrupt by competent counsel that concealed assets and fraudulent conveyances can be uncovered and brought to light, and it is of great importance that insolvents should thoroughly understand that although their petitions may fail to schedule or disclose their assets, their actions in regard to their business will nevertheless be subjected to rigid scrutiny. Bankrupts should be made to clearly comprehend that a premium has not been placed upon dishonesty by the provisions of the Federal bankruptcy law, and that when taking advantage of the act they must make full and true disclosure of their assets and of the past conduct of their business affairs in every particular.

W. L. C.

Notes from Great Britain.

The Market.

LONDON, November 26, 1904.—The improvement to which I have recently alluded continues, but is mainly in raw material. Compared with a year ago, the situation is certainly most encouraging. This time last year, it will be remembered, German agents were offering billets, sheets and bars at slaughter prices. It is true that German steel is now on offer at 83 shillings 6 pence, but this is merchants' stock, and there is not the slightest indication that the German syndicate is seeking business in this country beyond the ordinary staple lines at stable prices. So far as steel is concerned British makers have things pretty much their own way, with the result that an advance of 2 shillings 6 pence is quoted for next year's delivery. This is the first substantial indication of a general spread of hopefulness that the new year will open with an all round improvement.

Business in pig iron continues fairly good, and there are plenty of inquiries. In addition the movement of the warrant market and the concurrent advance in makers' iron at Glasgow and Middlesbrough have naturally had their influence on manufacturers in the Midlands. As a result Northamptonshire, Derbyshire and North Staffordshire irons are quoted from 6 pence to 1 shilling dearer than they were last week, and manufacturers are sanguine of obtaining the advance in view of the continued inquiry.

The only movement of note in finished iron is a further advance in the quotations for black sheets. All makers are now very fully occupied, and in some cases there is decided pressure for delivery on contracts extending into the beginning of next year. Galvanized sheets also continue to show a firmer tendency, due, as has been the case during the last few weeks, to the advance in raw materials. Spelter has again advanced on the week. In other directions the improvement is not so pronounced. There continues a very steady inquiry for marked bars, and makers of crown bars are now well occupied. Hoops and strip are in rather brisker sale.

The Case of Dorman, Long & Co.

One of the most progressive and substantial businesses in England is that of Dorman, Long & Co., who this year announce a profit of £23,566. This is a tremendous falling off from the previous year's earnings. It is explained that the trade during the period has been unsatisfactory in all departments of the iron and steel industries in which the concern is engaged, and while this is, of course, perfectly true, and may possibly afford an adequate reason for a turn of bad luck which, it is hoped, will prove shortlived, it is necessary to bear in mind the fact that the results of the past three years have borne witness to a rapid decline from the prosperous days of 1889-1900, when 15 per cent. was distributed. Then came a drop to 8½ per cent.—not a bad return on an industrial investment—but another falling away to 6 per cent. must have caused some uneasiness, intensified this time last November by a decline to 4 per cent. The fluctuating nature of the business was frankly confessed when the recent issue of second debentures was announced.

So far as dividends are concerned, the vanishing point has now been reached, but the question is being asked whether this falling away from prosperity may not be explained by the ambitious policy of expansion which has characterized the company. The measure of this expansion is best illustrated by a glance at the balance sheets over a series of years, and turning to that issued

in 1893 we find the share capital stated at £350,000, in addition to which there were debentures for £170,000. Ten years saw a growth in the paid-up share capital to £1,259,317 and an advance in the debenture debt to £400,000. Six months ago a further £250,000 in second debentures was offered for subscription, the reason for this addition being explained as follows in a memorandum attached to the prospectus: "The recent alterations and developments of the Britannia Mills, the Clarence Steel Works and the constructional department have been more extensive and costly than was at first intended. These extensions, with the resulting increase of production and the large increase of stocks required for the successful working of the company's business, have made it necessary to obtain further capital and the directors have determined to make the above issue."

A Notable Weigh Bridge.

There has just been dispatched from Leeds an unusually heavy weigh bridge for use at the Douglas colliery in the Transvaal. Provision has to be made for weighing the long trucks of that colony, containing up to 40 or 50 tons of coal, and also to allow the very heavy locomotives to pass over the machine with safety. To meet these requirements a total weighing capacity of 80 tons had to be provided. Samuel Denison & Son of Leeds were intrusted with the order. The gauge of the railway is 3 feet 6 inches. The length of the weigh bridge is 36 feet. Constructed in the most substantial possible way, this ponderous instrument is self contained in a massive cast iron framing, in which are carried all the main fulcrum bearings.

The machine weighs 25½ tons and is built on the three lever system. The girders are riveted steel of a strong box section, each weighing 4½ tons. A steelyard of an improved "single" pattern is attached, graduated up to 160,000 pounds, and this has only one poise weight—a compound one—containing slides for hundreds, tens and single pounds, thus dispensing with additional bars to the steelyard. Tickets recording the net and gross weights of each load may be stamped in duplicate, and thus a record of each load is kept, while a weigh note is also delivered. The pillars and steelyard not being placed inside an office, as is usually the practice in this country, had to be otherwise protected from the weather, and a strong wrought iron case or box has been ingeniously arranged so that when the machine is raised up into weighing position the cover is simultaneously lifted off the steelyard. When the machine is relieved or lowered to its dead supports the cover descends at the same time, and the steelyard is once more securely closed against damp and dust.

Iron Manufacture in Natal.

The first step in testing the possibilities of the development and working of the iron deposits of the Colony of Natal is now being taken. Some fifteen months ago an expert mineralogist was sent out to the colony by an English syndicate with the object of obtaining options over likely properties. Options were secured over some 35,000 acres in Northern Natal, principally in the districts of Dundee and Waschbank, and samples of ore were brought back to England for assay. These were sent to C. J. Head of London, and his assay showed that the ore contains 65.66 per cent. of metallic iron, 0.005 of sulphur and 0.029 of phosphorus. Another visit was paid to Natal by the managing director of the syndicate and the mineralogist, who, it is understood, have secured more options and concessions, and have returned to England to make further assays and to form a company which shall provide the necessary capital to build and equip works.

S. G. H.

The Board of United States General Appraisers on December 5 overruled a protest by Hermann Boker & Co. of New York against the classification of an importation of flat steel wire at 45 per cent. as valued at more than 4 cents a pound. It was claimed to be dutiable at various specific rates under paragraph 135 of the Dingley law. No evidence was offered, however, by the importers in support of their claim, and there was nothing in the record to disclose any error on the part of the collector.

Canada Against Reciprocity.

Industrial Expansion.

TORONTO, December 3, 1904.—To whatever cause it may be ascribed, manufacturing enterprise in this country is growing bolder. On all hands there are evidences of expansion. Visitors from beyond the border or beyond the Atlantic would not now carry away the impression that Canadian manufacturing interests are lacking in self confidence. Prosperity is not a new thing with most of the manufacturers of Canada, but caution continued long to exercise an undue influence over them. Works that might long ago have been doubled with safety were merely operated to full capacity or modestly extended. Undoubtedly one cause of distrust was uncertainty as to the tariff. Another was the fear that labor could not be got. In recent years, however, there has been the motive of flourishing business to impel toward enlarged operations. This can be said of nearly all departments of production except that of industries resting directly on iron ore and wool. In the manufacture of pig iron and steel there was no want of enterprise either at Sydney or at Sault Ste. Marie, but until lately the conditions were against it. In regard to the woolen mills they showed the least spirit of progressiveness and realized the poor results.

At the present time a new spirit seems to be in the air. Factories of all kinds are rising in the chief centers, companies to build others are being promoted and floated, and large additions to plant and equipment are being made by many concerns. Millions of capital are now being expended to add to Canada's manufacturing capacity. This has been going on for some time, and the movement has been accelerated by the recent changes in the tariff—the antidumping clause and the duty on steel rails. To the antidumping clause and to the Grand Trunk Pacific Railway project is credited the chief influence in bringing Americans into the country to establish manufactories.

Results of Better Protection.

Asked to account for a marked shrinkage in the duty returns on goods entered for consumption at the port of Montreal, the customs collector there said that one cause was the falling off in the importation of locomotives. In the season of navigation the locomotives entered at Montreal were valued at only \$108,790, as against \$1,198,240 the previous year. This decline is not due to a falling off in the railway demand, but to an increase in the capacity of home works. American capital took hold of the extensive new plant at Montreal, and added its output to the domestic manufacture. The 35 per cent. duty had also the further effect of causing the Kingston works to operate to the full limit.

The establishing of the works of the Canada Car Company in Montreal is said to be a result of the decision to build the Grand Trunk Pacific. The Government's contract with the Grand Trunk Pacific Company calls for the expenditure of \$15,000,000 on rolling stock on the completion of the Western division—the division, that is, which is to be built and owned by the company—from Winnipeg to the Pacific Coast.

Several new ventures are broached, and many of them are attributed to the working of the dumping duty. The Peterborough Shovel & Tool Company has been formed and incorporated. It is to make spades, shovels, picks, axes and various other tools. The capital, \$50,000, is only partly subscribed. It is reported that the American Axe & Tool Company will establish a large plant in Canada. It has done a good business in this country. The J. I. Case Company is reported to have been negotiating for a site in Fort William on which to put up large branch works for the manufacture of its threshers in Canada. Of other projects on foot one is for bringing into existence a tin plate mill at Morrisburg. A deputation from that town recently waited on the Minister of Railways and Canals to arrange for the leasing of 700 horse-power on the Morrisburg Canal, the power to be used for the operation of a tin plate mill. It was represented to the Minister that Montreal and Toronto

capitalists proposed to establish such works there, a capital of \$1,000,000 being contemplated for the purpose. The Minister promised to obtain a report on the matter. Paul Hock and Jules Weill, members of the General Metal Products Company of France, were in Ottawa recently, interviewing the Government on the subject of manufacturing steel rails and other steel goods in Canada. Several plants, of which the parent concerns belong to the United States, are understood to be ready to spring into life as soon as the power companies, whose works are now under way at Niagara Falls, are in a position to supply electricity.

No Reciprocity.

The progressiveness of Canadian manufacturing industry, as indicated above, must be taken into account in order to understand the attitude of Canadians on the subject of reciprocity with the United States. Canadian manufacturers have always been opposed to the idea of reciprocity, and their opposition has steadily grown with their manufacturing efficiency. Every year's new investments in buildings, power and equipment for manufacturing purposes are so much more staked on the prospects of industry. Millions of dollars, hundreds of shareholders, tens of thousands of workers, have been added to the manufacturing establishments of the country in recent years. All this stiffens the resistance of the manufacturing interests to reciprocity, and increases their influence with the Government for the rejection of reciprocity proposals. It is true that, much though it is able to show in the way of progress, Canadian manufacturing industry has still a great deal of ground to gain before it can all be graded as first class. But in nearly every department there are works that are models of organization, equipment and economy. Obsolete machinery and wasteful methods are fast disappearing. Specialization has not advanced as far as in the great industrial nations, but it is developing, and is as forward as it could be expected to be in a country of Canada's population. If immigration continues at its present rate the work of subdivision will be rapid, every factory budding out with two or three others, each engaged exclusively upon some one of the several processes formerly carried on within the four walls of one building. Examples of the development of specialization in Canadian works have become numerous of late. To mention one local case: The Gurney Foundry Company has recently had issue, so to speak. The manufacture of radiators, formerly carried on in its large Toronto works, has grown to such dimensions as to require a big factory of its own, and an extensive plant has been established by the company at Toronto Junction for the exclusive business of making radiators. The Canada Foundry Company's magnificent plant in Toronto is an outgrowth of the Canadian General Electric Company's system. In addition to the ventures of Canadian capital into new lines of manufacture, the transplanting of American branches in Canada and the progressive specialization of long established works, there is the colonizing, so to speak, of the West. Certain Ontario manufacturers have found it more advantageous to trade with the West through offshoots started there than from the main works. All this development tends to carry the country farther away from reciprocity. In fact, reciprocity never had fewer friends in Canada than it has to-day.

In the first place, there is no irritant, no thorn of dissatisfaction, pricking the country on to reciprocity as a remedy. The country is prospering. Farmers who at one time were zealous for reciprocity—as a means of opening another market for their produce and as a policy for cheapening the goods they have to buy—have now little to say about it. They are doing well and are not paying prices that they feel to be excessive—a state of affairs which itself testifies to the advance that has been made in Canadian manufacturing. Among manufacturers themselves the former conflict of interests has given place to a surprising solidarity. One seldom hears nowadays of manufacturers at one point in the scale of production protesting against the protection enjoyed by manufacturers a degree nearer the natural state of the material. There is little complaint that the duty on the

finished product of one department is unfair to another department which has to use such finished product as raw material. The chief influence in producing this better harmony, this intelligent co-operation, is undoubtedly the Canadian Manufacturers' Association, whose treatment of the tariff question has by patience been reduced to a system.

The desire for protection; the craving for a British preference which would give Canada's farmers an advantage over competitors in the great food importing country of the world; the feeling that production in the United States is competitive, not complementary; the notion that the United States would be sure to get the advantage in a reciprocity bargain; a belief that reciprocity would eventually compromise the country's political independence—all these things operate to keep Canadian opinion cold on the subject. Hence, manufacturers appear less to be consulting their own interests than expressing the general sense of the country when they mass their now powerful and well organized forces against reciprocity. It would seem impossible to work up enthusiasm for reciprocity in any important division of Canadian production.

Dumping Duty on Purchase Price.

The following decision, which is self explanatory, has been issued by the Customs Department:

The amount of any advance in the market value of the goods between the time of their purchase by the importer and the date of their exportation to Canada shall not be subject to special duty after November 9, 1904, provided the goods have been exported in the usual course and the actual date of purchase established to the satisfaction of the collector by contract or other sufficient documents produced for his inspection and attested to. Provided, however, in respect of goods subject to an ad valorem duty, that the ordinary duty shall be collected, as heretofore, on the fair market value of the goods as at the time of their direct exportation to Canada under the provisions of section 58 of the Customs act.

Iron and Steel Plants.

The Nova Scotia Steel & Coal Company, which began the production of pig iron on August 29, recently put in a claim for bounties amounting to \$5362, showing that its output since starting must have been 3574 tons, the bonus in the current fiscal year being \$1.50 per ton.

Large orders for wire rods are being received at the mill of the Dominion Iron & Steel Company. The company has been considering the idea of putting the mill on double shift. It is expected that the rail mill will be ready to operate in April. Machinery purchased for a plate mill is being delivered.

The Dominion Government's order for 20,000 tons of rails has been completed by the Sault Ste. Marie mill. Delivery has yet to be made at Montreal. C. A. C. J.

October Iron and Steel Exports and Imports.

According to the report just issued by the Bureau of Statistics of the Department of Commerce and Labor, the exports of iron and steel in October exceed in value those of any previous month of the current calendar year. The total value of iron and steel and manufactures thereof, not including ore, exported in October was \$12,798,481, as compared with \$11,150,815 in September. The total value for the ten months ending October 31 was \$105,350,418, against \$81,696,786 in the corresponding period of 1903. The total exports of iron ore for the ten months aggregated only 171,392 gross tons. Taking the commodities for which quantities are given, a slight falling off is noted as compared with September. These exports for October were 129,557 gross tons, as compared with 131,886 tons in September, 101,124 tons in August, 108,039 tons in July and 119,179 tons in June. The detailed figures for the month and ten months are given in the following table:

Exports of Iron and Steel.

Commodities.	October.		Ten months.	
	1904.	1903.	1904.	1903.
Gross	Gross	Gross	Gross	Gross
tons.	tons.	tons.	tons.	tons.
Pig iron.....	6,926	1,550	43,354	13,532
Scrap	2,568	1,261	24,782	4,891

Bar iron.....	2,506	1,206	24,889	16,936
Wire rods.....	475	1,482	14,517	20,526
Steel bars.....	1,850	718	21,605	14,502
Billets, ingots and blooms.	12,989	28	275,615	1,084
Hoop, band and scroll....	453	194	2,603	1,622
Iron rails.....	.....	.....	1,387	143
Steel rails.....	69,380	6,379	342,076	17,990
Iron sheets and plates....	516	143	3,898	4,501
Steel sheets and plates....	7,702	1,050	38,112	10,132
Tin plates and terne plates.	1,001	2	6,383	171
Structural iron and steel..	6,199	2,528	43,511	25,093
Wire	13,093	11,973	94,232	88,207
Cut nails.....	571	933	8,078	7,722
Wire nails.....	3,119	326	23,710	25,618
All other, including tacks.	209	298	2,409	1,933
Totals	129,557	30,071	971,161	254,103

It will be observed by the foregoing table that the great bulk of the commodities enumerated consists of steel rails, billets and wire. During the ten months ending with October the exports of steel rails aggregated 342,076 gross tons, billets 275,615 tons and wire 94,232 tons. It will further be seen that the exports for the ten months fell only a little short of 1,000,000 tons.

The iron and steel imports for October were again comparatively insignificant. The total value of iron and steel and manufactures thereof, excluding iron ore, was only \$803,378, as compared with \$1,841,174 for September. For the ten months ending October 31 the total value was \$18,405,021, which is a little less than half the value of similar imports in the corresponding period of the previous year. The imports of iron ore for the ten months were only 348,944 gross tons, as compared with 897,030 tons in the corresponding period of the previous year. Taking the commodities for which quantities are given, the imports in October show a slight falling off as compared with previous months. The October total was 20,575 gross tons, against 21,006 tons in September, 20,878 tons in August and 21,891 tons in July. The detailed figures for the month and ten months are given in the following table:

Imports of Iron and Steel.

Commodities.	October.		Ten months.	
	1904.	1903.	1904.	1903.
Gross	Gross	Gross	Gross	Gross
tons.	tons.	tons.	tons.	tons.
Pig iron.....	8,074	18,704	69,294	566,090
Scrap	449	3,836	11,806	77,939
Bar iron.....	1,355	4,872	17,139	36,832
Rails	3,213	2,820	37,444	90,093
Hoop, band and scroll....	1	55	1,942	1,488
Billets, slabs, bars, &c., steel in forms, n.e.s.....	731	1,034	9,579	253,554
Sheets and plates.....	160	265	3,775	8,161
Tin plates and terne plates.	5,033	3,937	61,068	40,149
Wire rods.....	1,028	1,708	13,062	17,035
Wire, and articles made from	363	406	3,372	4,152
Structural iron and steel*.	126	1,397	6,894	6,220
Chains	18	17	309	335
Anvils	24	11	123	201
Totals	20,575	39,062	235,807	1,102,249

* Included in "all other" prior to July 1, 1903.

The most interesting feature in connection with the above table is the demonstration that the imports of tin plates are still quite considerable, showing that our manufacturers are not making very heavy inroads into the purchase of foreign tin plates for exporting under the drawback regulations of the tariff. For the ten months of this year the imports of tin plates aggregated 61,068 gross tons, against 40,149 tons in the corresponding period of the previous year.

The Scott & Sons Company, manufacturer of the Ess Ess revolving chuck for the use of brass manufacturers making steam, water or gas goods, is located at Medford, Mass. An error was made in our advertising columns last week in giving the address as New Bedford. Those of our readers who may have written to that company at New Bedford will oblige all concerned by duplicating their letters to the company at Medford. The company claims that with this chuck the output per man can be increased from 100 to 200 per cent. Angular work having from one to sixteen ends can be finished at one chucking without stopping the lathe. The company's Catalogue A gives this and other interesting points.

Opening of the Mechanical Engineers' Convention.

The fiftieth meeting of the American Society of Mechanical Engineers was formally opened on Tuesday evening at the society's headquarters in New York City with an address by President Ambrose Swasey, the subject being "Some Refinements of Mechanical Science."

In his opening remarks the president congratulated the society on its creditable record for the 25 years of its existence, during which time it has grown to a membership of nearly 2900 and made itself an important factor in the progress of mechanical science and of the mechanic arts. The body of the address was of an extremely interesting nature, dealing with the developing and perfecting of certain mechanisms and instruments, notably those for the measurement of time and the taking of astronomical observations. Of historical importance was the part recounting the step by step improvement in means for indicating time from the earlier forms, the sun dial, hour glass and water clock, or clepsydra, down to the present, when we have chronometers with a mean error of only 15-1000 second per day.

From the description of the perfection attained in the measurement of time the speaker naturally led up to the even greater refinements necessary in astronomical instruments and methods to determine the length of the fundamental standards of time, the day and the year. In these instruments the accurate division of the circle to measure angles is the basic consideration, and here again the history of the art's advance was unfolded. Beginning with the work of the Arabians, who, about 1000, built a sextant with a 60-foot radius, mention was made of Tycho Brahe, "the founder of modern astronomy" and the first to construct smaller circles graduated with greater precision; Graham, 1725; Bird, 1767; Henry Hindley, who made the first circular dividing engine in 1740, and Huntsman, a clock maker of Sheffield, who in the same year invented crucible steel that he might obtain a suitable metal for clock springs. Continuing, President Swasey spoke in part as follows:

"Of the several engines constructed later the one most successful and representing the greatest progress was that made by Ramsden in 1777. This engine was automatic in its movements and was made especially for graduating circles. It has been preserved in the Museum of the Smithsonian Institution at Washington as the best example of that time of the art of graduating circles. Many excellent dividing engines have been made sufficient in point of accuracy for the work for which they were intended, but the perfection required in the graduation of circles for astronomical instruments has been found one of the most difficult of all mechanical problems.

"In such an engine the chief essential is that the spindle carrying the master plate shall be as nearly round and as closely fitted in its bearings as is possible, for the degree of excellence with which that work is done determines how closely a circle can be divided. It seems almost incredible that a well lubricated spindle 4 inches in diameter at its largest part and tapering $\frac{1}{4}$ of an inch to the foot can be made so nearly perfect that a movement of one-thousandth of an inch in or out of its bearings will in one case cause it to turn with difficulty, and in the other with perfect freedom, yet this has been found to be within the limits of mechanical refinements. The greatest accuracy thus far attained in such engines is one second of arc, which arc, with a radius of three miles, equals 1 inch, and at 20 inches, which is the radius of the silver ring upon which the graduations on the master plate are made, a line one-thousandth of an inch in width is equal to 12 seconds of arc, or 12 times the accumulated errors of any number of divisions.

"In automatically graduating a circle it has been found to be impracticable to cut more than six lines in a minute, and it requires about 33 hours to divide a circle into two-minute spaces. Instead of the large circles and sectors used by the ancients they have been made smaller as the methods for graduating have been

improved, until those of modern instruments are seldom more than 30 inches, and some of the latest meridian instruments but 25 inches. The smaller circles, made and graduated with greater precision than the larger ones, are also less liable to change in form, owing to their weight and the variation in temperature, and with the aid of the reading microscope the results obtained would not be possible with the larger circles. A 25-inch circle read with a microscope having a power of 40 would be equivalent to a circle of about 80 feet in diameter, and a single second of arc as seen through the microscope would be equal to 0.0024 of an inch, a quantity easily subdivided.

"A most important adjunct to the astronomer's instrumental equipment is the filar micrometer. With it he determines the errors of divisions, the eccentricity of his circle and measures the angles to within a fraction of a second; and when used at the eye end of the telescope he determines the positions and motions of the stars and the distances and diameters of the planets. In these little instruments, whether of the simple or complex form, the chief requisites are the screw and the cross wires, for upon them the value of the observations and measurements depends. To make the screw of a micrometer so true that the errors in the threads cannot be detected by its own magnifying power is an extremely difficult task. These micrometer screws are often made with 100 threads to the inch, and are provided with graduated drums having 100 divisions, the readings being made in tenths of a division.

"The cross wires, which are but common spider lines, because of their fineness and the remarkable qualities they possess, are indispensable in micrometric work. After many years' experience it has been found that the spider furnishes the only thread which can be successfully used. The spider lines mostly used are from one-fifth to one-seventh of a thousandth of an inch in diameter, and in addition to their strength and elasticity have the peculiar property of withstanding great changes of temperature. Platinum wires are made sufficiently fine and make most excellent cross wires for instruments where low magnifying powers are used, yet as the power increases they become rough and imperfect. Spider lines are made up of several thousands of microscopic streams of fluid, which unite and form a single line and remain true and round under the highest magnifying power. At the Allegheny Observatory the same set of spider lines in the micrometer of the transit instrument has been in use since 1859. The placing of the spider lines in the micrometer is a work of great delicacy, and in some micrometers there are as many as 30, which form a reticule, with lines two one-thousandths of an inch apart and parallel with each other, under the highest magnifying power.

"In the measurements of minute linear distances and the perfection of curved and flat surfaces the refinements are even greater than those pertaining to the measurement of time and of angles. Most important in the linear dividing engine is the screw, and it was for Professor Rowland to make an engine which has a practically perfect screw and is without doubt the nearest perfect of all the mechanisms that have been employed for ruling lines exactly parallel and equally spaced. This engine was made especially for ruling diffraction gratings of speculum metal, and with it a surface has been ruled with 160,000 lines, there being about 29,000 to the inch, and as many as 43,000 lines to the inch have been ruled. The gratings mostly used have from 14,000 to 20,000 lines to the inch, and with such exactness is the cutting tool moved by the screw that the greatest error in the ruling does not exceed one-millionth of an inch.

"The production of these gratings, which has enabled the physicist in his study of the spectrum to enter fields of research before unknown, has not only called for the highest degree of perfection ever attained in the spacing of linear distances, but also for a most difficult refinement in the optical surfaces upon which the lines are ruled. Mr. Brashear has produced such surfaces, and, notwithstanding the many difficulties encountered in working and refining the speculum metal plates, has

made plates with surfaces either flat or curved with an error not to exceed one-tenth of a wave length of light, or one four hundred thousandth of an inch.

"The established standards of length, which are the yard of Great Britain and the meter of France, being made of metal and liable to destruction or damage, Professor Michelson conceived the idea of determining the lengths of these standards in wave lengths of light, which would be a basis of value unalterable and indestructible. For these experiments the interferometer was constructed, an instrument which required the highest order of workmanship and the greatest skill of the optician. Mr. Brashear made for the instrument a series of refracting plates, the surfaces of which were flat within one-twentieth of a wave length of light, with sides parallel within one second. This was the most difficult work ever attempted in the refinement of optical surfaces.

"Professors Michelson and Morley devised a method for using the interferometer for making the wave length of some definite light an actual and practical standard of length, and experiments were conducted at the Bureau of Weights and Measures at Sèvres, France, where the standard meter, kept in an underground vault and inspected only at long intervals, was used for that important work, which occupied nearly a year. The final result of the experiments shows that there are 1,553,164.5 wave lengths of red cadmium light in the French standard meter at 15 degrees C. So great is the accuracy of these experiments that they can be repeated within one part in two millions. Should the material standard of length be damaged or destroyed the standard wave length of light will remain unaltered as a basis from which an exact duplicate of the original standard can be made. These two marvelous instruments, the Rowland dividing engine and the Michelson interferometer, show the possibilities in the perfection of linear divisions and the standards of length."

The Unveiling of a Portrait of John E. Sweet.

The president's address was followed by one from Charles Wallace Hunt in connection with the unveiling of a portrait of past President John E. Sweet. Professor Sweet was the originator of the scheme for starting a national association of mechanical engineers and, with Alex. L. Holley and Prof. Robert H. Thurston, founded the American Society of Mechanical Engineers in 1880, when it was started on February 16 in New York City with an original membership of 40.

SECOND SESSION.

The session Wednesday morning, December 7, was held in Mendelssohn Hall and constituted the business session of the annual meeting for the reports of the council, tellers and standing and special committees. The newly elected president for 1904-1905, John R. Freeman of Providence, R. I., was installed, and the report of the Committee on the Carnegie Building submitted. A discussion followed on the amendment to the constitution proposed at the last semiannual meeting in Chicago. The remainder of the forenoon was spent in the consideration of the following papers: "A New Hydraulic Experiment," by A. F. Nagle; "A Twist Drill Dynamo-meter," by W. W. Bird and H. P. Fairfield, and "Diamond Tools," by Gus C. Henning. Luncheon was served in the society's headquarters from 12.30 to 2.

THIRD SESSION.

Wednesday evening the third session was held in Mendelssohn Hall, and the following papers were presented and discussed: "Centrifugal Fans," by A. J. Bowie, Jr.; "Computation of the Values of Water Powers, and Damages Caused by the Diversion of Water Used for Power," by Chas. T. Main; "An Indicating Steam Meter," by Chas. E. Sargent; "Staybolts, Braces and Flat Surfaces—Rules and Formulae," by Robt. S. Hale, and "Condensers for Steam Turbines," by Geo. I. Rockwood. An abstract of the last mentioned paper will be found in another part of this issue.

Enrollment.

At the time of going to press the registration of members and guests had reached 490.

Gas, Retort Coke and By-Products.

Since 1893, when the first plant of by-product coke ovens in the United States was completed at Syracuse, N. Y., the quantity of coke produced in such ovens has increased so rapidly that in 1903 7.4 per cent. of the total coke product of the United States was thus manufactured. The successful development of this industry has been largely due to the profitable disposition made of the by-products obtained in the manufacturing process. A demand has arisen not only for information as to the total quantity and value of coke produced, but also as to the quantity and value of the gas, tar and ammonia produced at gashouses and at by-product recovery coking plants. In making its annual canvass of the coal mining and coke making industries for the last two years, the United States Geological Survey has, therefore, extended its inquiries to cover all plants producing gas and coke from coal with the recovery of the tar and ammonia. Reports were received in 1903 from 528 companies. The facts gleaned from these reports are set forth by Edward W. Parker in a paper entitled "The production of gas, coke, tar and ammonia at gas works and in retort coke ovens in 1903." This report is published as an extract from this Survey's forthcoming volume "Mineral Resources of the United States, 1903."

The total quantity of coal carbonized in 1903 was 5,843,538 short tons. The 528 companies produced 33,483,430,989 cubic feet of gas, of which 2,433,969,478 cubic feet were lost or unaccounted for and 31,049,461,511 cubic feet were sold. Of this total 73.9 per cent. was sold for illuminating purposes and 26.1 per cent. for fuel. The average price per 1000 cubic feet for all gas sold in 1903 was 97 cents. Prices for artificial gas are low in those States which have coal and natural gas among their resources. Such States are Illinois, Indiana, Kentucky, Ohio, Pennsylvania, West Virginia, and also Massachusetts, where a large portion of the coal gas made is a by-product from coke making in retort ovens.

The total production of coke amounted to 3,941,282 short tons, of which 1,882,394 short tons were obtained from by-product coke ovens, and 2,058,888 short tons were the product of gashouses.

Many coke companies are engaged also in the electric light business, and coke produced at the gas works, as well as a considerable amount of tar, is used for firing in the electric light plants. Other coal gas producers are also producers of water gas, and the coke from the coal benches is used for firing the water gas plant. Some coke is also used in the carbonization of coal at some of the gas works. It will be noted, therefore, that not all of the coke produced at gas works in the United States is sold, a considerable quantity of it being consumed at the works where it is produced.

The total quantity of coal tar produced in 1903 was 62,964,393 gallons, valued at \$2,190,969, or 3.49 cents a gallon. The largest production of tar in both 1902 and 1903 was in Massachusetts, with New York second, Ohio third, Pennsylvania fourth and Alabama fifth.

Only about 20 per cent. of the companies that manufacture coke and gas reported the recovery of ammonia, either in the form of ammoniacal liquor or sulphate. The total quantity of ammonia liquor produced and sold was 64,396,662 gallons, which would be equivalent to 17,479,759 pounds of anhydrous ammonia, or 67,821,465 pounds of sulphate. The total quantity of sulphate of ammonia produced and sold in 1903 was 11,925,752 pounds. The total production in 1903, reduced to its equivalent in sulphate, was 79,747,217 pounds.

Comparatively little progress has been made in this country in the manufacture of chemical products from coal tar. Although we produce over 50,000,000 gallons of coal tar annually, we import at the same time millions of dollars' worth of chemicals obtained from coal tar. A conservative estimate would place the total value of these products in the wholesale markets of this country at \$12,000,000.

S. H. Chauvenet has resigned his position as manager of the Robeson Iron Company, Ltd., Robeson, Pa.

Trade Publications.

Portable Drilling Machinery.—A catalogue of portable drilling machinery and boiler shell drills has been received from the Thomas H. Dallett Company, York street and Sedgley avenue, Philadelphia, Pa. It shows a number of power drills which can be carried to the work where the work is heavy and hard to move, and so save time. The tools are driven in various ways either by snatch rope connection from conveniently disposed countershafts or by electric motor. The fore part of the catalogue contains a general description of the machines, indicating their adaptability and usefulness and illustrating the particular features of their operation. This is followed by half-tones, specifications and prices of A and B portable drills and the Nos. 1, 2, 3, 4 and 5 portable drills, all of these being driven by rope connections with 3, 4 or 5 step grooved driving pulleys. Electric portable drills are made in sizes 4 and 5, the whole equipment being arranged to be handled by crane and set up with flexible electric connections from convenient outlets. The duplex boiler shell drill is adapted for movement within a limited range from tracks placed conveniently close to the work. A 5-spindle boiler shell drill is also shown. The latter part of the catalogue deals with fixtures, such as tables, &c., and with Dallett hand drills. A few words are said at the close in regard to pneumatic tools which this company also manufactures, and a special hose coupling for use with them.

The Doble Regulating Needle Nozzle.—The Abner Doble Company, San Francisco, Cal., has printed as Bulletin No. 6, a thesis prepared by H. C. Crowell and G. C. D. Lenth, in the Civil Engineering Department of the Massachusetts Institute of Technology, this being an investigation of the Doble regulating needle nozzle. Those interested in hydraulics, and the theory of the action and efficiency of nozzles as used in water wheel propulsion, will be interested in this scientific treatment of the subject.

Electric Hoists and Coal Handling Machinery.—Catalogues on these two subjects have been received from the C. W. Hunt Company, West New Brighton, Staten Island, N. Y. The first is known as catalogue 046 and deals with electric hoists, winches and capstans for direct and alternating current. These are made in sizes of from 5 to 200 horse-power with drums adapted to wire or Manila rope of various sizes. They are in three standard speeds, slow, medium and rapid, according to the use for which the hoist is intended. The catalogue gives an instructive description of the various parts and a discussion of the features and their operation. The illustrations show the application of various makes of motor to hoists in various manners to suit all conditions. A leaflet inserted in this catalogue concisely states what the company is prepared to furnish in the way of industrial railways, electric locomotives and coal handling machinery, conveyors, steam hoist engines, electric hoist engines and Manila rope. Catalogue 047, on coal handling machinery, is extremely comprehensive. A few of the examples of apparatus illustrated are steeple and boom towers, steam shovels, hoisting elevators, conveyors, coal crackers, trolleys, cable and automatic railways, steam and electric hoisting engines, coal valves, screens, chutes, hoppers, scales, rope, chain and attachments.

Lathe Chucks.—The Sweetland chuck, manufactured by the Hoggson & Pettis Mfg. Company, New Haven, Conn., is described in its catalogue 7. The valuable information which it gives will appeal to the large field of manufacture having occasion to use chucks. The illustrations are admirably chosen to indicate with a little study the principle of the chuck's action. They are made in various styles and sizes, all of which are illustrated, these including combination, universal, independent and geared scroll chucks, also two-jaw, car wheel and special chucks. In the latter part of the catalogue are shown other tools for every day use in machine shops, such as drill chucks, drill press vises, surface gauges, scribing blocks, steel stamps, cutting dies, seal presses, &c.

Wire Rope Tramways.—The A. Leechen & Sons Rope Company, St. Louis, Mo., has recently brought out a catalogue on aerial rope tramways, of which the usual complimentary words might be said concerning its attractive illustrations and more than ordinarily useful text on the rope tramway subject. It sets forth once more the advantages obtained with aerial systems, and besides the valuable suggestions which the photographs of numerous installations convey, gives illustrations of details in connection with the buckets and their manipulation. The wire rope used is of various cross sections, the merits of which are indicated in its description.

Dust Collecting Systems.—Catalogue No. 25, from the Allington & Curtis Mfg. Company, Saginaw, Mich., is addressed to the users of dust producing machinery. As explained in the introduction, the conditions vary so in individual plants that it is impossible in a catalogue to do the subject full justice; but merely to lay down the general principles which might apply in the majority of cases. The various parts in a dust collecting system are illustrated; also numerous views of installations typical of the manner of connecting up systems for removing dust from its source of production to furnaces or other places of disposal. The catalogue will interest those engaged in wood working or textile industries especially.

Driving the New York Subway is the subject of an interesting booklet which appeared nearly simultaneously with the opening of the Subway, being published by the Ingersoll-Sergeant Drill Company, 26 Cortlandt street, New York City. For its attractive get-up and the little history which it gives of the Subway it will doubtless be retained by many as a souvenir.

Illustrations show several scenes of the work in the course of construction and other views of completed work. The purpose of the book is to show the part which the Ingersoll-Sergeant machinery played in the construction of the Subway, and also the part it will continue to play in its operation, as it will be used for ticket cancelers and switch and signal systems. The latter part of the book gives a little illustrated description of various types of rock drills and air compressors.

Separators and Water Heaters.—Warren Webster & Co., Camden, N. J., have recently brought out four new publications. The largest and most important of these is Part 3 of their general catalogue, which illustrates and describes the Webster separators for steam and oil. The oil separators are of two general types, horizontal and vertical, and the horizontal form is also made in connection with a receiver. Steam separators are of five classes, A, C and E being horizontal and B and D vertical. Each form of separator is illustrated both by exterior and sectional views, which, with the information given relating to the uses each is particularly intended for, will be of assistance to the intending purchaser in making his selection. A post card mailed by the company contains a few words as to the utility of Webster separators and the performance guaranteed. A small booklet is also being mailed which was provoked, so it is stated, by the knowledge that but comparatively few engineers are aware that the Webster Star vacuum feed and water heater can be adapted to a condensing plant and give satisfactory results. The pamphlet proceeds under headings of "Facts," "Figures and Results" to prove that the heater can be so used. A folding mailing card tells of the saving effected after the installation of the Webster system in the Wisconsin Veterans' Home, Waupaca, Wis.

Machine Tools.—An illustrated catalogue has lately been received from the Carroll-Jameson Machine Tool Company, Batavia, Ohio. The company engages in the manufacture of a line of engine lathes, speed lathes, wood lathes, drill presses, special tools and grinders, all of which are described in this catalogue. The lathes begin with small foot power lathes and include a 14-inch engine lathe. Parts and attachments for lathes, details of special features and lathe tools and wood turning tools are shown in the back of the catalogue.

Grab Buckets.—An artistic little pamphlet, practically all half-tones and line diagrams, has been published by the Jeffrey Mfg. Company, Columbus, Ohio, to illustrate the construction and working of its grab buckets. Attention is called to the extremely wide opening of the bucket and the claims advanced that it is the most powerful made and is absolutely self filling. Two of the illustrations show the bucket in operation taking mine-run coal from the car. The diagrams are mainly to illustrate various methods of handling the buckets for power house equipment, coal and ore unloading, sand handling, &c.

Fire Brick.—If there is a subject which does not lend itself handily to catalogue illustration, it is fire brick. Nevertheless, it has been admirably accomplished in a catalogue recently brought out by the Brooklyn Fire Brick Works, 88 Van Dyke street, Brooklyn, N. Y. There is not much occasion for text other than to identify by size and quality the various forms and patterns manufactured. In this way the catalogue is sifted down to just the information which the user generally wants and wants quickly.

Blast Grates.—E. J. Gordon & Co., Greenville, Mich., are sending out a booklet describing the Gordon economy blast grate. Illustrations show the construction and method of placing the grates under boilers, and the description has much to say concerning the advantages accruing from its use. With the catalogue are included a number of testimonial letters and a measurements blank by the filling in of which those interested may obtain information as to the cost for the erection of grates in their own boiler plants.

NOTES.

The Ingersoll-Sergeant Drill Company and the Westinghouse Traction Brake Company, both of New York, are associated in the distribution of pamphlet Form 343, describing the storage air brake system of the St. Louis Transit Company. It is a system naturally of some interest, as the railway company has very recently been severely tested in the handling of the vast crowds at the World's Fair. It is a booklet which will interest engineers generally and managers of street railways particularly, and was distributed to the members and guests of the American Street Railway Association at their recent convention.

The Reeves Pulley Company, Columbus, Ind., has issued a small booklet illustrating and describing the construction of the three designs of wood rim pulleys with iron centers which it manufactures. These were shown in *The Iron Age* of September 1, 1904.

The Becker-Brainard Milling Machine Company, Hyde Park, Mass., as on the occasion of the Pan-American Exposition, has brought out a booklet illustrating with small cuts the machines which appeared in its exhibit at the Louisiana Purchase Exposition. Each cut is accompanied by a statement of the size and feeds of the several machines. A circular attended by a letter is also being mailed, to call attention to the milling cutter business in which this firm engages.

The Star Corundum Wheel Company, Detroit, Mich., is mailing a circular pertaining to emery and corundum wheels. It gives an explanation of numbers of emery and grades of wheels, a grade list, instructions as to selection of grades for different work, with a table for selections of grades, directions for using and a price-list of wheels regularly kept in stock.

The Iron Age

New York, Thursday, December 8, 1904.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.

Our Export Trade in Iron and Steel.

A very marked change has come over the large producers of iron and steel during the past few months with reference to their attitude to the export trade. In the earlier part of the year the one consideration was to fill as much as possible the gaps which a slack home demand had left in the rolling sheets of the mills. The export trade in the heavy branches was depended upon to furnish a good tonnage and thus distribute general charges, give more regular employment and lower the cost of the whole line of products made. The cry was for 100,000 tons of steel per month.

The leading makers sought eagerly foreign business in steel rails, billets and bars, plates, shapes, wire products and tubes. How well they succeeded is clearly evidenced by the monthly statistics of exports, so far as they show tonnage figures.

In the steel rail trade special circumstances have led to a swelling of the shipments. The policy adopted by the Canadian Government has led to a rush in the purchases for our northern neighbor, from whom we cannot expect any tonnage for some time to come.

But aside from this, the revival of our home demand has led to a sharp change in the export policy of producers. As we understand it, they are not heavily committed beyond the current year, and have now decided to sell only enough steel in its heavier forms to hold what markets they have conquered. In some branches our manufacturers will probably only take orders enough to prove their claim to a share in the business of the world and possibly establish the basis for an allotment in international pools of the future. In other lines it is necessary that the trade must be held in order to maintain uninterrupted relations with consumers. This is particularly true of the iron products and to a lesser extent of tubes, which we kept on exporting even during the period when steel was so scarce that we imported heavily from abroad.

The Financial Reports.

It is evident from the reports of the Secretary of the Treasury and the Comptroller of the Currency that there is not the least expectation of any currency legislation. The Comptroller does not mention the subject. The Secretary repeats the evident fact that the currency is inelastic, and says something of the cause and effect of this, but suggests no change. There is no disposition to touch the subject, and the inconveniences of the present system will have to be repeated in some serious form before Congress can be induced to take action.

The bank circulation is not quite half the capital, and, while it may be quite large enough in view of the large volume of Government notes, these notes constitute a fixed element in the circulation; the only variable element is the bank note circulation, which expands under the favoring influence of legislation and contracts under the adverse influence of a high price of bonds, but moves

in neither direction in response to the commercial needs. The Secretary says:

Banks are not likely to use their last \$100,000 reserve in the purchase of Government bonds as a basis for an equal amount of currency not available for reserve, but which increases to that extent their liabilities. On the contrary, banks sometimes retire their circulation and sell their bonds for the purpose of replenishing reserve and reducing liabilities. During the summer months of the current year reserves increased and interest rates were correspondingly low, but this very plethora of money resulted in an increase of national bank circulation.

The currency expanded at the very time when there was no commercial reason for it. The bond secured circulation increased during the report year \$43,879,760. From the end of October, 1903, to the end of September, 1904, the increase was continuous; each month showed a gain over the previous month, regardless of the much greater needs in the autumn than at other seasons. The increase, says the Comptroller, "was mainly due to the comparatively low market price of 2 per cent. consols prevailing during the year." But low as is the interest on these bonds, the premium on them ranged from 4.7 to 6.583, due entirely to their availability to banks as a basis for circulation. With the increase of banking there must be an increased demand for bonds, the supply of which is reduced by the Sinking Fund requirements. In the last three years more than \$90,000,000 of bonds have been bought on account of the Sinking Fund. With the diminished supply and increased demand the price of bonds must increase, the profit of a bond secured circulation decrease, and the reduction of circulation will follow. The available security may be increased by the Panama Canal bonds, but it is evident that the conditions are not permanent.

The Secretary directs attention to the fact that trust companies are growing faster than national banks. This is due in a measure to the reduced profit on circulation, and if a financial institution does not issue notes there is no obvious advantage in operating under the national law. The Secretary, however, believes that the prestige, or the additional security of depositors, resulting from Federal supervision would lead some trust companies to organize under a national trust company law, the enactment of which he recommends, which should not carry the right of note issuing, but should provide for Federal supervision and the maintenance of a relatively small reserve. But the rapid growth of trust companies is due very largely to the fact that they do not have to carry a reserve in their own vaults, and such companies have given up the privileges of the New York Clearing House rather than comply with the moderate requirements regarding reserves recently imposed by it upon trust companies.

The Comptroller makes one recommendation which would be in the direction of elasticity. It is the repeal of the limitation of \$3,000,000 on the amount of national bank circulation to be retired in any one month. Designed to prevent contraction, this has promoted it. Slow and continuous reduction of circulation went on for years in spite of it, but when, in the crop-moving season, additional circulation was needed banks refused to issue it because they could not promptly retire it after the exigency had passed. Two years ago the Secretary said the banks would have issued \$50,000,000 of circulation but for this. The Comptroller also makes a recommendation of considerable interest to the public and to banks. It is that the provision of the law of March 14, 1900, limiting the \$5 notes of any bank to one-third of its issue be repealed. It was only intended that not more than one-third of the circulation of all the banks should be in fives. The fact is that that ratio has not

been exceeded for 30 years. Under the restriction of four years ago it has fallen below one-sixth, and the lack of \$5 bills is an inconvenience.

The Secretary reports that in the fiscal year there was a deficit of \$41,770,571, due to the Panama payment, and he estimates the deficits for the current and ensuing years at \$18,000,000 and \$22,000,000, respectively. There is no great increase of revenue to be looked for under existing laws. For the fiscal year 1906 he estimates the customs at only \$8,000,000 more than in 1904, and he estimates another \$8,000,000 increase in internal revenue. The expenses of the last year were \$30,000,000 more than the year before, exclusive of the Panama payment and the advance to the St. Louis Exposition. The expenses of the current year are estimated at \$25,000,000 more than last year, omitting the Panama payment. The point has been reached where there must be a sharp reduction in expenses or additional sources of revenue will have to be found.

The Break in Cotton.

The Department of Agriculture announced on Saturday that preliminary returns indicate a total production of cotton, excluding linters, in the United States this year of 12,162,000 bales. As linters will probably total 250,000 bales, the crop will be approximately 12,400,000 bales. The largest previous crop was that of 1899, which amounted to 11,275,000 bales. This year's yield, therefore, is considerably over 1,000,000 bales larger than any previous year's crop. The figures just published corroborate the showing made in October, when statisticians calculated that the report of acreage and condition indicated a crop of over, rather than under, 12,000,000 bales. The cotton market had been gradually declining for some time in anticipation of the possible announcement of a very large yield, but leading operators on the Cotton Exchange had quite generally come to the conclusion that—by reason of deterioration—the figures would be in the vicinity of 11,500,000 bales. Hence when the official figures were made public, and ran so much in excess of expectations, a violent break in prices occurred. January cotton sold down to under 8 cents per pound, which was not only the lowest price of the season, but the lowest since the fall of 1902.

The change in the position of cotton, as compared with a year since, is very great. The staple was then selling at 17½ cents per pound. While the change which has thus been brought about is exceedingly unwelcome to such planters as had not marketed their 1904 crop, it must be admitted that it is advantageous to other important interests. The return to more normal conditions as to the raw material will stimulate cotton manufacturing operations, both at home and abroad. The high prices prevailing during the greater part of the year threw the manufacturing end of the cotton trade sadly out of joint. Manufacturers' operations were restricted. Operatives' wages in cotton factories were reduced. In notable instances, as at Fall River, protracted strikes resulted against the attempted adoption of a lower wage scale. Thus the movement of cotton to domestic manufacturing centers and the shipments to foreign markets were considerably under what they would have been if the staple had been selling at about its customary price.

Out of this disjointed condition of affairs, however, the South has reaped much benefit. Planters have enjoyed a period of rampant prosperity, to which they had long been strangers. Capital has thus accumulated in a section of the country in which it was most needed, and a substantial foundation has been laid for the growth

of the South in material greatness. Nothing could have happened more opportunely than this period, even though brief, of extraordinary profits in cotton culture. Now that prices are lower, Southern transportation interests are likely to come in for a season of much heavier traffic and greater earnings. The record breaking crop, of course, assures them of a great bulk of freight to be moved to market, but it would move much more slowly if prices were being maintained at last year's level. With heavy earnings, the Southern railroads will be better purchasers of equipment and track material.

The Standardization of Implement Parts.

Newell Sanders, president of the Newell Sanders Plow Company, Chattanooga, Tenn., delivered an address before the convention of the National Association of Implement and Vehicle Manufacturers on "Shop Practice," in which he strongly urged that steps be taken by manufacturers of similar implements to standardize their parts on the same basis that the master car builders of the country have adopted standard specifications. He suggested that manufacturers get together, discuss which form of part is best, and then adopt it as the association standard, and took the position that reduced cost to the steel mills and other manufacturers of implement makers' supplies, due to the simplification of specifications, would lead to a great saving in cost of raw materials. Not only would the standardization of parts reduce the cost of materials, but also the cost of labor in fabrication, owing to the reduction of sizes and varieties. Another important point brought out was the fact that the standardization of such things as wheels, seat springs, &c., that are common to many implements, would be of the greatest service to the farmer, as it would enable him to make temporary repairs on one machine by dismantling another that was not in service. Another reason upon which his recommendation of standardization was based is the growing foreign trade of American manufacturers. Foreigners, he held, are wont to look at American manufacturers collectively, and to expect a similar part of one American machine to serve as repair for another. This matter is of such great importance to makers of agricultural shapes that it would be distinctly to their advantage to confer with the implement makers with a view to the ultimate selection and adoption of association standards in as many lines as possible.

Time for a Rest in Productive Expansion.

The rush of capital into new manufacturing enterprises during periods of trade activity has occasionally been commented upon as considerably accelerating the demand for iron and steel at such times. Activity in the iron market thus stimulates itself, and the subsidence of this stimulus as the effort toward productive expansion is exhausted intensifies the collapse which always follows boom periods. As bearing upon this subject it is interesting to note what is said by George Paish, who has recently been touring the United States in the interest of the *London Statist*. Prior to sailing for England Mr. Paish was interviewed by the *New York Times* relative to the result of his investigations into the state of economic affairs in this country. In his opinion, as quoted in that paper, "the United States has entered upon another period of trade expansion, which must continue for several years unless unforeseen disasters—such as a general and persistent failure of the crops—should be encountered." He gives a number

of reasons for his belief, the fifth and last being as follows:

The extension of manufacturing plants in recent years has been so great that a much larger output can be made without appreciable additional capital outlays, thus making a large portion of the new supplies of capital arising from the nation's surplus profits available for other purposes, notably construction of additional railway tracks now badly needed on many lines to take care of the traffic.

This statement coincides with the views of those of our own people who are well informed with regard to the extent of the expansion in our manufacturing facilities within the past three years. The iron and steel plants now completed, or so rapidly approaching completion that they must be reckoned with as active factors in the near future, can take care of a demand much in excess of that of 1902-3, when it was found necessary to supplement the home supply with considerable quantities brought from foreign countries. We can expect that for some little time, possibly for a year or two at least, the iron trade will not draw heavily upon itself to supply material to go into new iron producing enterprises. It certainly seems most desirable, for the welfare of the trade, that capital should for a time seek other investments than in new plants for the production of iron and steel.

Operations of the American Sheet & Tin Plate Company.

It is the intention of the American Sheet & Tin Plate Company to have all its sheet and tin plate plants in full operation before the first of the year. Already a number of the plants that have been idle for some months have been started up, while others will resume this week and some next week, or just as soon as a supply of sheet or tin bars can be secured. We give below a complete list of the 246 tin plate mills and 163 sheet mills owned by this company. The union tin plate plants are as follows:

Name and location.	No. of Mills.
American, Elwood, Ind.....	28
Anderson, Anderson, Ind.....	7
New Castle, New Castle, Pa.....	20
Shenango, New Castle, Pa.....	30
Sharon, Sharon, Pa.....	20
La Belle, Wheeling, W. Va.....	10
Laughlin, Martins Ferry, Ohio.....	23
Morewood, Gas City, Ind.....	8
Falcon, Niles, Ohio.....	6
Humbert, Connellsville.....	6
Pittsburgh, New Kensington.....	7
Pennsylvania, New Kensington.....	6
Total	171

The nonunion tin plate plants owned by the company are as follows:

Name and location.	No. of Mills.
Monongahela, Pittsburgh.....	8
Star, Pittsburgh.....	8
United States, McKeesport.....	11
National, Monessen.....	25
Crescent, Cleveland.....	6
Chester, Chester, W. Va.....	7
Cambridge, Cambridge, Ohio.....	6
Total	71

The Champion, a 6-mill plant at Muskegon, and the Banfield plant, a 4-mill plant at Irondale, Ohio, have been abandoned. The Monongahela Works, which is credited in the above list as having 8 mills, is operating under the Bray semicontinuous system and is making an output equal to the product of about 14 hot mills. Of the above plants 8 mills at Elwood, Ind.; 7 at Anderson, Ind.; 10 at Sharon, Pa.; 7 at Martins Ferry, Ohio, and 13 at New Kensington, Pa., were idle at the close of last week. Of the idle tin plate plants the Pennsylvania Works at New Kensington, Pa., with 6 mills, was started on December 5, and the Pittsburgh Works at the same place, containing 7 hot mills, will be started during the week of December 12. The American Works at Elwood, Ind., containing 28 hot tin plate mills, started in full on December 5, as did the Laughlin Works at Martins

Ferry, Ohio, containing 23 hot mills. Of the 20 hot mills in the Sharon Works at Sharon, Pa., 15 were in full operation on December 5, and the other five will be started in a few days. The Humbert plant at Connellsville will be started on December 12.

The American Sheet & Tin Plate Company owns 17 sheet mill plants, containing 163 hot mills. At the close of last week 13 plants, containing 141 mills, were in full operation, and 4 plants, containing 22 hot mills, were idle. The idle plants are located at Dresden, Ohio; Canton, Ohio; Struthers, Ohio, and Muncie, Ind. These idle sheet mills will be started just as soon as the Carnegie Steel Company can furnish an ample supply of sheet bars to them. A complete list of the sheet mills owned by the American Sheet & Tin Plate Company is as follows:

Location.	No. of Mills.
Bridgeport, Ohio.....	23
Canton, Ohio.....	5
Canal Dover, Ohio.....	10
Cambridge, Ohio.....	7
Hyde Park, Pa.....	5
Leechburg, Pa.....	10
Muncie, Ind.....	7
New Philadelphia, Ohio.....	10
Piqua, Ohio.....	4
Saltsburg, Pa.....	4
Scottdale, Pa., No. 1.....	9
Scottdale, No. 2.....	8
Struthers, Ohio.....	6
Vandergrift, Pa.....	29
Wellsville, Ohio.....	10
McKeesport, Pa.....	12
Dresden, Ohio.....	4

Total 163

The American Sheet & Tin Plate Company will increase the Vandergrift plant by the addition of another open hearth furnace and several more galvanizing pots. The furnace will be of the same capacity as those now in operation, 35 tons. These additions will make a total of 9 open hearth furnaces and 20 galvanizing pots at the Vandergrift plant.

Changes in International Harvester Company's Officials.—The resignation of E. A. S. Clarke from the position of general manager of the International Harvester Company, Chicago, has resulted in the following promotions and shifting about of officials of that company: Geo. F. Steele, formerly manager of the collection department, succeeds Mr. Clarke as general manager of the manufacturing department, involving the general control of the various manufacturing plants of the company. Burr A. Kennedy, who has had charge of the erection and equipment of plants, becomes Mr. Steele's first assistant. John G. Woods, formerly general superintendent of the McCormick Works, is second assistant, and E. F. Jones, at one time purchasing agent of the Deering Company and later general manager of mines, timber properties and other sources of raw materials, has been made third assistant. H. F. Perkins, who has been general manager of purchases of the International Harvester Company, is made general manager of a newly created steel department, involving principally the management of the Bessemer steel plant at South Deering, Chicago. W. O. Jones has been advanced from first assistant purchasing agent to the general management of that department. F. A. Kauffman has been promoted from the position of first assistant manager of collections to general manager. These changes will be put into effect December 15, at which time Mr. Clarke will leave for the East.

The value of steam turbines for very large ships has been put in an unfavorable light, according to a cable from Glasgow, by the recent speed trials of the Allen Line's Victorian, which was launched August 25, and is the largest turbine driven steamship ever built. It was found impossible to get the vessel up to the contract speed, and, as a consequence, it is understood that construction of the turbine engines for the new Cunard liners has been suspended until a more satisfactory performance is assured.

Fan and Positive Pressure Blower Tests.*

BY W. H. M'FADDEN, VICE-PRESIDENT AND GENERAL MANAGER,
MACKINTOSH, HEMPHILL & CO.

Review.

At the March 7 meeting of the Pittsburgh Foundrymen's Association Thos. D. West presented a paper entitled "Fan Power for the Cupola." In this paper Mr. West gave his experience in installing a fan for cupola work. He included data which showed that it required a very much greater horse-power to run the fan than had been anticipated by the makers. He called attention to the fact that the data supplied by the fan builders made no mention of the horse-power required, and contended that some data should be compiled showing the power used in running a fan with an open and closed outlet. This paper brought up a very spirited discussion regarding the amount of horse-power required to run a fan blower and a positive pressure blower.

A committee was appointed as a result of this discussion to further investigate this question. It sent out a list of questions to representative foundries hoping that the answers would determine approximately what horse-power was being used to run a fan and a positive pressure blower. An interesting set of answers was received to these questions. Very few of them were complete, however, and it was impossible to obtain from them the information desired. These replies were tabulated and presented to the association at a subsequent meeting. The contradictory results reported in these answers were very unsatisfactory to the committee, and W. H. McFadden, a member of the committee, volunteered to have a test made at the works of Mackintosh, Hemphill & Co. He contended that in order to get a true comparison the test should be made under exactly the same conditions.

Inquiries were sent out to different fan and blower makers for fans and blowers to be used in the test. The Connersville Blower Company, Connersville, Ind., and the B. F. Sturtevant Company, Hyde Park, Mass., very kindly agreed to supply a positive pressure blower and a fan blower, respectively, for the test.

Construction.

The size of the cupola, together with other necessary data, was supplied to each, and the selecting of the blowers, pulleys, &c., was left to them. They were asked to have their representatives present at the test, and both sent their mechanical engineers. The Westinghouse Electric & Mfg. Company furnished a motor for the test and supplied an engineer to take the readings. S. H. Stupakoff furnished a pyrometer and took the readings. J. & H. Phillips furnished the belts. The cupola used was 54 inches inside the lining. The piping and wind box were new and were installed by Mackintosh, Hemphill & Co. for the test. Leakage was reduced to a minimum. Every precaution was taken to do away with bends and elbows, and wherever one was necessary it was made on as easy lines as possible.

The capacity, speed of motor, sizes of pulleys, position of blowers and fans and the arrangement of the piping were satisfactory to the representatives of the fan and blower makers.

The 33 cubic foot positive pressure blower was placed on a solid cement foundation at a considerable expense. The No. 10 fan was placed on a heavy oak platform directly over the blower. They were so arranged in order to save room and piping and to eliminate one bend in the pipe for fan connecting. It was necessary to have one extra elbow in the blower connection. The pipes enter the cupola at the top of the wind box on opposite sides of the cupola. The pipe was No. 10 riveted and was guaranteed air tight by the maker. A water column pressure gauge was used for taking pressure and was attached to the wind box of the cupola.

Speed of Motors and Blowers.

The same motor was used for both tests (a 50 horse-power, 220 volt, shunt wound, rated at 825 revolutions

per minute). For the blower test it was run at an average speed of 819 revolutions per minute and for the fan test at a speed of 839 revolutions per minute. For the fan test the motor was equipped with a 30-inch pulley, and the fan was fitted with a 16-inch diameter, 15-inch face pulley. The B. F. Sturtevant Company had previously notified us that it desired to run the fan at from 1500 to 1550 revolutions. The blower was equipped with a 60-inch pulley, 15-inch face, and the motor was fitted with a 12½-inch pulley.

History of Tests.

First Test.—The first test was made October 17. The blast was supplied by the No. 10 Sturtevant fan. The readings on the voltmeter and ammeter were taken by an engineer from the Westinghouse Electric & Mfg. Company. Mr. Stupakoff took temperature readings on a Le Chatelier pyrometer. Sixty thousand seven hundred pounds of metal were charged into the cupola. One-half scrap and one-half pig was used as being a fair representative of ordinary foundry practice. Fifteen hundred pounds of coke were charged on bed, followed by 4500 pounds of iron. The balance of the heat was made up of 4000-pound charges, with 450 pounds of coke to the charge. The last charge was 4200 pounds of iron.

Readings were taken every 10 minutes, the pressure at the cupola being taken at the same instant as were the readings at the motor.

The following table gives a condensed record of this heat:

Table No. 1.

Time.	Pressure.	Number volts.	Number amperes.	Electric power.	Horse-power.	Speed.	Temperature.
2.02	12½	212	145	41.2	36	840	.....
2.10	12½	208	155	43.2	38.5	844	.....
2.20	17½	215	148	42.6	38	840	.....
2.30	12½	216	144	41.7	37	845	.....
2.40	13½	216	132	38.2	33.5	850	.....
2.50	13½	220	128	37.7	32.5	840	.....
3.00	13½	218	130	38	33	840	.....
3.10	13	218	128	37.4	32.5	825	.....
3.20	13½	218	120	35.1	30.5	840	.....
3.26	....	...	...	....	....	...	.....
3.30	13½	220	126	37.2	32.5	845	{ 2,185° (ladle)
3.40	13½	216	125	36.2	31.5	830	.....
3.50	13½	220	115	33.9	30	845	.....
4.00	14	217	123	35.8	31	847	.....
4.10	14	217	112	32.6	28	845	.....
4.20	14	219	112	32.9	28.5	837	.....
4.30	14½	217	110	32	27.5	840	.....
4.40	13½	217	105	30.5	25	833	{ 2,150° (ladle)
4.50	13½	214	105	30.1	25	832	.....
5.00	13½	214	110	31.5	26	830	.....
5.10	13½	218	110	32.1	27.5	838	.....
5.20	14	219	110	32.3	28	838	.....
5.30	14	220	115	33.9	30	840	.....
5.40	13½	220	120	35.4	31	840	.....
5.50	13½	219	130	38.2	33.5	837	.....
Average 13.0	...	...	...	35.8	31.2	830	.....

This shows the time the readings were taken, the pressure at the cupola, the temperature of the metal, the current and voltage readings, the electric horse-power figured from the latter and the horse-power figured from the curve furnished with the motor. The temperature of the metal was taken in order to determine whether there was any decided difference in temperature of the iron melted with the fan and blower. The material charged, including coke, was all accurately weighed. The melted iron was weighed as it came from the cupola, and is recorded in the following table, which gives a record of the iron melted as each ladle was taken from the cupola:

Table No. 2.

	Time taken.	Amount melted.
	Time. Hours. Minutes.	
Wind on	2.02 .. ..	.....
First tap	2.23	23
First ladle out	3.38 1 ..	36 27,630
Second ladle out	4.30 1 ..	1 14,750
Third ladle out	5.10	31 6,000
Fourth ladle out (bottom drop)	5.48	38 7,800
Amount taken out in shanks .....	..... ..	700
Amount left in cupola .....	..... ..	800

Total amount melted iron..... 57,680

Figuring from the above data, we find that the heat

* Paper read before Pittsburgh Foundrymen's Association, December 5, 1904.

lasted 3 hours and 46 minutes. The average amount of iron melted per hour based on iron melted was 15,312 pounds, or 7.65 tons. During the first part of the heat the cupola melted at the rate of 17,200 pounds per hour, in the middle of the heat it was melting at the rate of 15,000 pounds per hour, while at the end of the heat it was melting but 12,200 pounds per hour. This decrease in the rate of melting was due to the fact that the tuyeres became partly closed up at the end of the heat; consequently less wind was supplied by the fan.

The following table shows the fan blower heat:

Table No. 3.

Total time of heat, 3 hours 46 minutes.		
	Pounds.	Tons.
Average amount melted per hour, based on iron charged	16,116	(8.06)
Average amount melted per hour, based on iron melted	15,312	(7.65)
Rate of melting, first of heat, based on iron melted	17,262	(8.63)
Rate of melting, middle of heat, based on iron melted	15,000	(7.5)
Rate of melting, end of heat, based on iron melted	12,230	(6.12)

From table No. 1 we find that the average electric horse-power consumed would be approximately 35.8. The heat lasted 3.76 hours, so that the total electric horse-power consumed was about 134.8. The amount charged was 30.35 tons. The electric horse-power hours per ton charged would consequently be 4.41 and the kilowatt hours per ton charged would be 3.29. From this data, with the cost per kilowatt hour known, the exact cost of power for the heat can be figured.

Table No. 4.

Total length of heat, 3 hours 46 minutes (3.78 hours).	
Average horse-power consumed by motor	35.8
Total electric horse-power hours for heat	134.8
Number of tons charged	30.35
Number electric horse-power hours per ton charged	4.41
Number kilowatt hours per ton charged	3.29
Number tons melted	28.84
Number electric horse-power hours per ton melted iron	4.67
Number kilowatt hours per ton melted iron	3.41

Second Test.—The second test was made October 19. A 33 cubic foot Connorsville blower was used to supply the blast. The conditions prevailing during this heat were the same as governed the test on the Sturtevant fan on the 17th. The same motor was used; the proportion of pig to scrap was identical; the cupola was charged in a like manner and the scrap selected was of a similar grade to that used in the previous test. The difference in piping is readily observed in the sketch. Sixty-three thousand pounds instead of 60,700 pounds were melted. Fifteen hundred pounds of coke were used on the bed and 4500 pounds of iron were charged on the first charge. Four hundred and fifty pounds of coke and 4000 pounds of iron made up the next 14 charges. On the sixteenth charge 300 pounds of coke were used to 2500 pounds of iron. This proportion of coke to iron gave a ratio of about 1 to 8, which is a fair average of foundry practice.

Table No. 5 gives a record of the time the readings were taken, the current and voltage, the electric horse-power figured from the same, and the horse-power figured from the curve sent with the motor. The speed of the motor and pressure readings were taken at identically the same time as were the voltmeter and ammeter readings.

Table No. 5.

Time.	Pressure.	Electric				Speed.	Temperature.
		Number volts.	Number amperes.	Horse-power.	Horse-power.		
2.00	10½	224	80	24	19	825	.....
2.10	14½	217	110	32	28	830	.....
2.20	14	218	108	31.4	26	830	.....
2.30	16½	218	118	34.5	30	835	.....
2.40	18½	218	130	38	32.5	835	.....
2.50	21½	216	150	43.4	39	830	.....
3.00	23¼	214	152	43.6	39	810	.....
3.10	23	215	152	43.8	39	810	.....
3.20	23½	212	152	43.2	38	810	.....
3.30	23½	214	155	44.4	40	812	{ 2,165 (ladle) first
3.40	25	212	156	44.3	40	815	.....

3.50	24	216	160	46.3	41	815	.....
4.00	24	214	165	47.3	42.5	820	.....
4.10	25	210	177	49.8	45	815	{ 2,175 (ladle) second
4.20	24½	212	170	48.3	43.5	816	.....
4.30	20½	214	145	41.6	36.5	830	.....
4.40	19½	214	140	40.2	35	830	.....
4.50	19½	215	123	35.4	30.5	780	.....
Average 20%	...	...	...	40.6	35.8	819	.....

The following table gives a record of the iron as melted:

Table No. 6.

	Time Taken.		Amount Melted.
	Time.	Hour. Minutes.	
Wind on	2.00	..	.....
First ladle out	3.33	1 33	31,800
Second ladle out	4.05	.. 32	12,100
Third ladle out	4.28	.. 23	6,620
Fourth ladle out (bottom drop)	4.49	.. 26	6,950
Taken out in shanks, left in cupola, &c.	...	..	2,207

Total amount melted iron, pounds..... 59,677

The total time consumed was therefore 2 hours 49 minutes. The average melting per hour figured on the amount charged was 22,368 pounds (11.2 tons). The average per hour figured on the amount melted iron was 10.6 tons.

During the first of the heat the iron was melted at a rate of 20,500 pounds per hour, during the middle of the heat at the rate of 22,300 pounds per hour and during the last of the heat at the rate of 17,700 pounds per hour. This data is included in table No. 7.

Table No. 7.

Total time of heat, 2 hours 49 minutes.		
	Pounds.	Tons.
Average amount melted per hour, based on iron charged	22,368	11.2
Average amount melted per hour, based on iron melted	21,186	10.6
Rate of melting the first part of heat, based on iron melted	20,520	10.2
Rate of melting middle of heat, based on iron melted	21,400	10.7
Rate of melting last of heat, based on iron melted	17,718	8.9

From table No. 5 we find that the electric horse-power taken by the motor was 40.6. The heat lasted 2 hours 49 minutes, consequently the total electric horse-power consumed was 114.49 horse-power hours; 31.5 were charged, so that the electric horse-power hours per ton charged would be 3.63, and the kilowatt hours per ton charged would be 2.71. This data is included in table No. 8:

Table No. 8.

Average electric horse-power supplied to motor	40.6
Total electric horse-power hour for heat	114.49
Number of tons charged	31.5
Electric horse-power hours per ton charged	3.63
Kilowatt hours per ton charged	2.71
Number tons melted iron	29.8
Electric horse-power hours per ton melted iron	3.84
Kilowatt hours per ton melted iron	2.86

Table No. 9.

	Oct. 17. Sturtevant.	Oct. 19. Connorsville.	Oct. 22. Connorsville.	Nov. 16. Sturtevant.
Tons charged	30.35	31.5	32	31
Tons melted	28.84	29.8	30.08	28.81
Tons iron charged per hour	8.06	11.2	10.9	10.07
Tons iron melted per hour	7.65	10.6	10.2	9.40
Number of hours run	3.77	2.82	2.93	3.08
Average electric horse-power (motor)	35.8	40.6	36.3	34.6
Average horse-power (from curve)	31.2	35.8	31.55	....
Horse-power hour per ton charged	4.41	3.63	3.32	3.43
Kilowatt hour per ton charged	3.29	2.71	2.47	2.68
Horse-power hour per ton melted	4.67	3.84	3.53	3.70
Kilowatt hour per ton melted	3.41	2.867	2.63	2.76
Average speed of motor in revolutions per minute	839	819	756	1102
Average speed of blower in revolutions per minute	1557	171	151	2204
Average pressure in ounces	13.6	20.6	20.75	12.5
Ratio of coke to iron	1-7.82	1-7.78	1-7.9	1-8

In table No. 9 I have included data on both tests.

Comparisons.

If we examine this table we will note that in the two tests which we will call official, the average electric horse-

power for the fan was 35.8, while the average for the blower was 40.6. The highest horse-power required by the fan was 43.2 against 48.3 for the blower. If, however, we note the total horse-power consumed, we will see that the fan consumed 134.8 horse-power hours for 30.35 tons, while the blower required but 114.49 horse-power hours for 31.5 tons. This shows 4.41 horse-power hours per ton of iron charged for the fan and 3.63 horse-power hours per ton of iron charged for the blower, a difference of 0.78 horse-power hours in favor of the blower. The difference in time for melting the two heats was 57 minutes in favor of the blower. This would allow the user of the blower to postpone putting on the blast about one hour longer for a 30-ton heat. The saving thus made would depend upon the class of work and the number of men employed. Against these advantages in favor of the blower may be set the lower original cost of the fan, the lower cost of installation, and the fact that the high pressure of the blower test was much more severe on the lining of the cupola.

The fan blower makers claim a saving in repairs and in wear over the positive pressure blower, while the makers of the latter call attention to the great wear and slipping of the belts due to the high speed at which the fan runs. These are points that cannot be settled in a two days' test.

The results of these tests show:

1. Under the conditions existing in the test, it took 4.8 less horse-power to run the fan than it did the blower.
2. That to melt a 30-ton heat, it took 23.4 less horse-power hours with the blower than with the fan.
3. That it took approximately one hour longer for a 30-ton heat when the fan was used than when the positive pressure blower supplied the blast.
4. That the temperature of the metal was approximately the same for the two heats.
5. That the blower caused a much greater wear on the lining of the cupola than did the fan.

Note.—In comparing these records with other tests, it should be remembered that very heavy scrap was used and the records obtained should not be compared with a cupola melting light scrap. This difference in the weight of the scrap makes a large difference in the speed of melting in a cupola, as will be shown in the latter part of this paper.

Supplementary Tests.

In examining the data obtained from the two previous heats, I was convinced that the results obtained in the blower tests could be improved in economy by running the blower at a slower speed. To prove this, another heat was run October 22. While this heat cannot be said to be official, the data should be of interest to this association. The readings were taken by our own electrical engineer, James F. Tracy, and all the care observed in the previous heats was observed in this one.

Third Test.—In a third test, the pulley on the motor was reduced to a 12 inch, and the motor was run at a speed of 756 revolutions, instead of 819 revolutions, as in the previous heat. The data for this test will be found in table No. 10.

Table No. 10.

Time.	Pressure.	Number volts.	Number amperes.	Electric horse power.	Horse power.	Speed.
12.15	11	225	80	24.1	20	760
12.25	11½	225	92	27.7	23.5	770
12.35	12½	225	76	22.9	17.5	770
12.45	15	225	90	27.1	23	765
12.55	16½	220	100	29.5	25	765
1.05	19½	220	110	32.4	28	750
1.15	22½	210	125	35.2	30	745
1.25	22½	225	130	39.2	35	750
1.35	25½	218	145	42.4	37.5	750
1.45	24½	210	145	40.8	35.5	750
1.55	25	214	140	40.2	35	750
2.05	25	218	145	42.4	37.5	750
2.15	25½	216	150	43.4	38.5	760
2.25	26	210	155	43.6	38.5	760
2.35	26	216	155	44.0	40	770
2.45	26	216	155	44.0	40	760
2.55	21½	220	130	38.3	34	770
3.05	20½	220	125	36.8	32	780
3.15	18½	220	113	33.3	29	780
Average	20½	218	124	36.3	31.55	756

It will be noted that average pressure was approximately the same as in the previous heat, but that the average electric horse-power was decreased from 40.6 on the 19th to 36.3 on the 22nd. To be sure, the time for the heat was slightly prolonged, but the total number of horse-power hours consumed was decreased from 114.49 to 106.36.

The writer believes that a still further decrease in the amount of air supplied would have shown a greater economy in the electric horse-power consumed. The motor was, however, run at the slowest speed; the pulley on the motor was as small as it was possible to use and it did not appear to be practical to use a larger pulley on the blower. It would have been necessary to have installed a slower speed motor to have carried the investigation any further. Under the conditions, this was not practical. Further data in connection with this heat will be found in Table No. 11.

Table No. 11.

	Pounds.	
Wind on.....	12.14	...
First tap.....	12.38	...
All melted (2 hours 56 minutes).....	3.10	59,160
Left in cupola.....		990
Total amount melted.....	60.150	...
	Pounds.	Tons.
Rate of melting per hour (iron charged).....	21,816	10.9
Rate of melting per hour (iron melted).....	20,502	10.2
Total electric horse-power hours.....		106.36
Electric horse-power hours per ton iron charged.....		3.32
Kilowatt hours per ton iron charged.....		2.47
Electric horse-power hours per ton iron melted.....		3.53
Kilowatt hours per ton iron melted.....		2.63

For a comparison of this heat with the two previous heats see Table No. 9.

Fourth Test.—We observed in our regular heats that better results were obtained with our old No. 8 Sturtevant fan than were shown in the test with the No. 10 fan. In order to ascertain exact figures for comparison a further supplementary heat was run November 16, using the No. 8 Sturtevant fan. This test cannot be used as a direct comparison with the others, as it was taken at a different time, and the conditions necessarily varied. This fan had been used in our work for several years. The motor was a 30 horse-power Westinghouse motor and was run at an average speed of 1100 revolutions per minute. Piping was new and air tight. There was one more bend in the pipe than when the No. 10 fan was tested. The readings were taken by our own electrical engineer. Exactly the same conditions were observed as prevailed in the previous heats. One-half pig and one-half scrap

Table No. 12.

Time.	Pressure.	Number volts.	Number amperes.	Electric horse-power.	Speed.
1.45	11	218	115	33.6	1,100
1.55	10½	214	128	36.7	1,100
2.05	11½	220	130	38.3	1,100
2.15	12½	220	130	38.3	1,100
2.25	12½	220	126	37.2	1,100
2.35	12½	220	125	38.8	1,100
2.45	12½	220	125	36.8	1,100
2.55	12½	218	120	35.1	1,100
3.05	12½	220	115	33.9	1,100
3.15	13½	220	115	33.9	1,120
3.25	12½	220	115	33.9	1,100
3.35	12½	220	112	33	1,100
3.45	13½	218	110	32.4	1,100
3.55	13½	218	110	32.1	1,120
4.05	13½	218	110	32.1	1,100
4.15	13½	216	110	31.5	1,100
4.25	12½	216	115	33.3	1,100
4.35	12½	220	115	33.9	1,100
4.45	11½	...	...	...	...
Average.....	12½	...	...	34.6	1,102

was used in making up the charges. The same method of charging was observed and a ratio of 1 of coke to 8 of iron was maintained. The chief difference between this heat and the three previous was in the scrap. In the three previous heats, all the scrap used was heavy scrap in such shape as to pack closely in the cupola. In the last heat there was a small amount of very light scrap used, which tended to keep the cupola open. The result of this will be noted in the reading found in table No. 12.

The material charged and the melted iron were weighed, as in previous heats. The temperature of the iron was not taken, but it came good and hot all through the heat. The record of this heat will be found in table No. 13.

Table No. 13.

	Pounds.	Tons.
Wind on	1.43	.....
First ladle out.....	2.30	12,360
Second ladle out.....	3.00	10,600
Third ladle out	3.22	7,150
Fourth ladle out	3.47	7,720
Fifth ladle out	4.26	11,850
Sixth ladle out	4.48	6,790
Taken out in shanks and left in cupola.....	1.160	.....
Total amount melted.....	57,630	28.81

It will be noted from the above that the cupola melted very uniformly throughout. The average melting per hour per ton charged was 10.07 tons and the average melted iron tapped per hour was 9.41 tons. From 1.43 to 3.22 (1 hour 39 minutes) 30,110 pounds were melted, or a rate of 9.1 per hour for the first hour. In the middle of the heat the iron was tapped at a rate of 9½ tons per hour, and at the end of the heat it was tapped at a rate of 9.3 tons per hour. This shows the uniform melting mentioned above.

Table No. 14 gives the above data and table No. 15 gives horse-power, &c., figured from two previous tables.

Table No. 14.

	Tons.
Average amount melted per hour, based on iron charged..	10.07
Average amount melted per hour, based on iron melted..	9.41
Rate of melting, first of heat per hour, based on iron melted	9.1
Rate of melting, middle of heat per hour, based on iron melted	9.5
Rate of melting, last of heat per hour, based on iron melted	9.4

Table No. 15.

Average horse-power consumed by motor.....	34.6
Total electric horse-power hours for heat.....	106.56
Horse-power hours per ton charged.....	3.43
Kilowatt hours per ton charged.....	2.68
Horse-power hours per ton melted.....	3.70
Kilowatt hours per ton melted.....	2.76

This test shows a much lower electric horse-power than when the No. 10 fan was used. It will also be noted from the tables that the average pressure was somewhat lower. The electric horse-power in heat of October 17 varied from 43.2 as a maximum to 30.1 as a minimum, a difference of 13.1 electric horse-power. The heat on November 16 varied from 38.8 to 31.5, a difference of but 7.3 electric horse-power. This indicates a greater decrease in outlet in the first instance than in the second. In foundry parlance, we would say that the cupola became "barged up" in the first instance. The rate of melting shows a decrease in the first heat, while in the latter heat the melting rate was practically constant. The reason for this is probably due to the fact that the latter heat was kept open by a mixture of some light, open scrap.

A comparison of this heat with the three previous ones will be found in table No. 9.

Conclusions.

It is not my intention to draw any definite inferences as to the relative efficiency of the fan and the blower for cupola practices. I have endeavored rather to record the data in as complete a manner as possible. There are, however, a few points which should be brought out to make the report complete:

1. The test has proved that, under favorable conditions, a 40 horse-power motor is sufficient to supply power for a blower or fan furnishing blast for a 54-inch cupola.

2. The rate of melting is not proportional to the amount of air supplied to cupola. Too much air will tend to cool the cupola around the tuyeres and thus reduce the melting area.

3. In a 54-inch cupola, when all heavy scrap and pig was charged, the 33 cubic feet positive pressure blower melted more economically and faster than did the No. 10 fan blower.

4. The No. 8 fan melted much more economically and faster when the cupola was kept open by a small amount of light scrap than did the No. 10 fan when all heavy scrap was used.

5. The high pressure produced by the positive pressure blower has a much more severe cutting effect on the lining than had the lower pressure produced by the fan blower.

6. The original cost and the cost of installation of the positive pressure blower would considerably exceed that of the fan blower.

7. The actual saving in horse-power is not a large item. The saving due to the shorter time taken by the blower would depend upon the number of men employed and the price of work.

8. The difference in economy between the two types of blower depends largely upon the cupola practice. The above tests would indicate that where the tuyeres were kept clean and the cupola was not packed too tight, there would not be any great difference in favor of either of the types of blowers. If the tuyeres are allowed to become partially closed, the positive type would prove the better.

Addenda.

There are two or three admitted facts that should be borne in mind in studying the above report.

1. In order to obtain economical results in the fan blower curves should be avoided as much as possible, and when necessary should be made in easy lines.

2. A fan delivers only as much air as there is a free opening for it to pass through. The horse-power required to operate the fan decreases as the free outlet closes.

3. A positive pressure blower must supply a given amount of free air per revolution. As the opening decreases in the cupola, due to closing up of the tuyeres, &c., the positive blower will force the same amount of air through this opening as it previously forced through the larger opening. It will, however, require a much larger amount of power to accomplish this.

4. The pressure of air at a cupola, as recorded in a pressure gauge, is of value for comparisons only. The number of revolutions per minute of the positive pressure blower and the amount of horse-power consumed by the fan blower are the only guides to the amount of air supplied to the cupola.

The Pittsburgh Foundrymen's Association.—The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the rooms of the Engineers' Society of that city on Monday evening, December 5. W. H. McFadden was in the chair, and F. H. Zimmers was secretary. There was a very large attendance, among those present being: W. H. McFadden of Mackintosh, Hemphill & Co.; Joseph T. Speer, Pittsburgh Valve Foundry & Construction Company; William Yagle, Yagle Foundry & Machine Company; John A. Logan, Jones & Laughlin Steel Company; H. F. Barker, Taylor, Wilson & Co., Limited; J. Hunter Sleeth and S. B. Sleeth, Westinghouse Air Brake Company; George England, Edgar Thomson foundries; S. Sheriff, O. B. McMillan and D. L. Eynon, Seaman Sleeth Company; A. W. Slocum, National Car Wheel Company; E. D. Frohman, S. Obermayer Company; F. H. Zimmers, Union Foundry & Machine Company; James Kearn, J. F. Brown and Ralph H. West, Mesta Machine Company; J. S. McCormick of J. S. McCormick Company, and B. D. Fuller of Westinghouse Electric & Mfg. Company. In all there were over 50 members present at the meeting, making it by far the most largely attended meeting of the Pittsburgh Foundrymen's Association that has been held since it has been organized. The large attendance was due to the intense interest in the paper on reports of tests made by Mackintosh, Hemphill & Co., on "The Results Obtained on Blowers and Fans on the Cupola," and which is printed elsewhere in this issue. After the reading of the paper it was discussed to some extent, but a full discussion of it will be had at the next meeting of the association, to be held January 9, 1905.

The armored cruiser Tennessee was launched December 3 at the Cramp shipyards, Philadelphia, Pa. She is of 14,500 tons displacement and will be one of two of the most powerful cruisers constructed.

The United Sheet & Tin Plate Company.

Quite a number of rumors have been going the rounds of the press relative to a settlement of the affairs of the United Sheet & Tin Plate Company, which went into bankruptcy some time ago. It has been learned on excellent authority that a majority of the creditors agreed recently to accept a compromise of 20 per cent. The people of Marietta, Ohio, where the principal plant of the company is located, have made earnest efforts to bring about a settlement, and it has several times been announced in the local papers that the works would be put in operation in about 30 days, but that time has passed and nothing definite has transpired regarding the actions of the Pittsburgh syndicate which was reported as being prepared to acquire the tin mill of the company at Marietta, the sheet mill at Newcomerstown, and the property at Byesville, Ohio, which latter consists of foundations for one open hearth furnace and a bar mill roll train, partly covered with buildings. Meanwhile, the case of James L. Shawver *et al.* versus the United Sheet & Tin Plate Company remains in the United States Court at Columbus. This suit is the result of controversy among stockholders and creditors, and is very complicated in its nature. Lakin C. Taylor of Columbus, formerly of Cambridge, Ohio, who promoted the combination known as the United Sheet & Tin Plate Company and was one of its officers, has been very diligent in his efforts to obtain control for the Pittsburgh syndicate, and it is noted in the Columbus papers that he is also promoting a bank known as The Capitol Savings & Trust Company. Among the list of directors several names appear of men who have been connected with the sheet and tin plate business. It is significant that persons from Morgantown, W. Va., are interested, there being an idle tin mill for sale at that point, also Meyersdale, Pa., where a new sheet mill is now being built. Other persons named in connection with the banking company are closely connected with the steel roofing business. It is hoped by citizens of the towns where the idle mills are located that the bank combination may help to restore the condition of the various plants to active operation. Another large tin mill, not in operation, in the same district, is at Clarksburg, W. Va., known as the Jackson Sheet & Tin Plate Company.

OBITUARY.

JAMES P. WALSH, for many years superintendent of the brass department of the Baldwin Locomotive Works, Philadelphia, and who was subsequently engaged in the brass foundry business on his own account in that city, died November 30, aged 65 years. He was born in Ireland and came to this country when a child.

CHARLES COUSE, manufacturer of machinery and leather belting, Newark, N. J., died on December 3 in New York City from apoplexy. He was born in Sauger-ties, N. Y., 63 years ago, and served in the Civil War.

STEPHEN C. FRALEY, head of the metal firm of S. C. Fraley & Sons, Philadelphia, Pa., died on December 2, aged 65 years. Mr. Fraley was a very prominent member of the Masonic order, and was actively interested in a number of other organizations.

FRANKLIN DUNDORE of the firm of F. Dundore & Co., bankers and brokers, one of the oldest members of the Philadelphia Stock Exchange, died November 27 as a result of a stroke of apoplexy at his home at Chestnut Hill. Mr. Dundore was 66 years old. Thirty years ago he was a prominent iron merchant in Philadelphia.

SAMUEL HUMPHRIES, treasurer of Samuel Trethewey & Co., Limited, Pittsburgh, manufacturers of steel shear knives and special machinery, died November 29.

The Griffin Wheel Company, Chicago, has bought the plant and business of the Chicago Car Wheel & Foundry Company. This company, whose plant is at Forty-third and Wood streets, was formerly known as the Fort Wayne Car Wheel & Foundry Company and was owned principally by J. H. Bass. The Griffin Wheel Company is operating the plant.

The Canadian Installment System of Patent Fees.

Canada has an installment system of patent fees under which the inventor need not pay a lump sum to protect his patent for the full period of 18 years during which his invention is safeguarded for him. The full fee is \$60. He may pay it all down and have no further occasion for worry, or he may pay \$20 down, receiving protection for six years, and before the end of the sixth year \$20 more, and then, when his 12 years' protection is running out, \$20 more, which gives him the maximum 18 years of a patent's life. Or he may pay for 12 years at the beginning, or at the end of 6 years may pay up for the remaining 12 years. Sir Lloyd Wise, in a recent address on needed reforms in the Canadian patent laws, advocated extending this installment law still further, so that after five years' protection under an initial fee of \$20 the patentee may make annual payment of \$3, or, of course, he may pay in advance to whatever extent he may deem fit up to the full fee. The argument used in connection with this system is that it better enables the inventor of small means to obtain a patent and to maintain it; and, more important, it acts as an automatic weeding out of patents through lapses in payments where they are not being worked, thus opening to the industrial community a fund of ideas which otherwise would be barred to them during the full life of a patent. One so called weakness of the system as it stands is that hardship may be imposed by depriving the patentee of all his rights because of his failure to pay one installment fee on time. Sir Lloyd Wise proposes that a system of fines be arranged so that the patentee may have the right to renew the lapsed patent within one year of the time of the overdue payment by the payment of a fine of, say, \$5 for three months, \$10 for 6 months, \$15 for 9 months and \$25 for 12 months. In connection with this plan the patentee would be deprived of his right to sue for infringement occurring during the period between the time the fee became due and the date of the payment of the fine. Probably a great many American inventors and manufacturers would welcome such a provision in the United States patent laws for both the reasons advanced in favor of the system as in use in Canada or as proposed with the change. The diminished drain on the finances of the inventor has obvious advantages, and the lapsing of unworked patents due to nonpayment of fees would rid the manufacturer of a good deal of annoyance.

Rapid Steel Construction Work.—On August 31 the Seamless Tube Company of America of Pittsburgh, which is building a large plant at Monessen, Pa., for the manufacture of seamless steel tubes, gave a contract to the McClintic-Marshall Construction Company of Pittsburgh for the erection of a steel building, which called for its completion within 60 days from date. The erection of the building was started September 1, and the entire building was completed three days before the contract time had expired. The structural steel workers handled an average of 30 tons of steel each day. The building is 125 feet wide by 600 feet long. The McClintic-Marshall Construction Company has received a contract for the steel work for the new Majestic Theater in Chicago, which calls for about 3000 tons of structural steel, and has also received contracts for bridge work from the Northern Pacific Railroad, calling for about 750 tons of steel.

It is said that Eastern capitalists have made a bid of \$275,000 for the plants of the Coxey Steel Casting Company and the Coxey Silica Sand Company, at Mount Vernon, Ohio, and that it will be accepted and both plants put in operation.

C. H. Wood, late manager of the Detroit Seamless Tube Company, has succeeded A. H. Hutchinson as Western manager of the Shelby Tube Company at Chicago.

Pig Production Increasing Rapidly.

A Sharp Lowering in Stocks on Hand.

The statistics of the production of pig iron which we present below illustrate in a striking manner how the output adjusts itself to changed conditions. The capacity has been very considerably increased, and further additions to it have already taken place or are in preparation. It looks as though before midwinter we will be making and using iron at our maximum rate.

Coke and Anthracite Furnaces in Blast

Location of furnaces.	Number of stacks.	December 1.		November 1.	
		Number	Capacity	Number	Capacity
		in blast. per week.		in blast. per week.	
New York.....	19	11	16,155	10	15,740
New Jersey.....	8	4	6,384	4	6,500
Spiegel.....	2	1	221	1	216
Pennsylvania:					
Lehigh Valley.....	27	14	9,150	12	8,194
Spiegel.....	1	1	204	1	221
Schuylkill Valley..	13	9	9,940	7	6,570
Low. Susquehanna.	10	5	7,463	5	6,950
Lebanon Valley....	11	2	1,697	2	1,730
Spiegel.....	1	1	529	1	531
Pittsburgh district.	37	32	89,775	31	88,183
Spiegel.....	3	3	1,657	2	1,119
Shenango Valley..	21	14	26,470	11	22,706
West. Penn.....	24	14	19,386	13	18,826
Spiegel.....	1	0	0	0	0
Maryland.....	5	3	6,162	3	6,488
Wheeling district..	13	8	14,960	8	15,871
Mahoning Valley... 17	15	15	34,562	11	26,458
Central and North- ern Ohio and Mich.	18	11	25,000	11	27,682
Hocking Valley....	2	0	0	0	0
Hanging Rock.....	12	8	5,915	7	4,621
Illinois.....	21	14	33,550	14	33,885
Spiegel.....	1	0	0	1	1,002
Minnesota.....	1	1	1,155	1	824
Wisconsin.....	5	4	4,486	3	3,160
Missouri.....	1	0	0	0	0
Colorado.....	4	2	3,947	2	3,328
Spiegel.....	1	0	0	0	0
The South:					
Virginia.....	23	8	5,039	4	2,445
Kentucky.....	8	3	1,520	2	619
Alabama.....	43	22	26,020	21	25,210
Tennessee.....	16	9	4,782	8	4,600
Georgia.....	1	1	1,017	1	540
North Carolina... 1	0	0	0	0	0
Totals.....	371	220	357,146	197	334,249

For a series of months the active anthracite and coke furnace capacity fluctuated as follows:

Coke capacity per week.		Coke capacity per week.	
December 1, 1904.....	357,146	May 1.....	373,496
November 1.....	334,249	April 1.....	386,215
October 1.....	319,249	March 1.....	347,424
September 1.....	291,573	February 1.....	335,339
August 1.....	246,092	January 1, 1903.....	346,073
July 1.....	272,301	December 1, 1902.....	336,617
June 1.....	336,197	November 1.....	330,110
May 1.....	368,244	October 1.....	337,837
April 1.....	337,257	September 1.....	328,243
March 1.....	308,751	August 1.....	328,745
February 1.....	273,692	July 1.....	303,793
January 1, 1904.....	185,636	June 1.....	337,492
December 1, 1903.....	244,156	May 1.....	337,627
November 1.....	273,715	April 1.....	331,140
October 1.....	353,142	March 1.....	316,039
September 1.....	360,197	February 1.....	325,440
August 1.....	353,681	January 1, 1902.....	291,992
July 1.....	384,825	December 1, 1901.....	317,358
June 1.....	388,178		

A considerable number of blast furnaces resumed in November, there being among them Cedar Point in New York, Topton and the second Warwick in the Schuylkill Valley, Lehigh and Keystone in the Lehigh Valley, one Edgar Thomson spiegel and No. 2 Eliza in Pittsburgh, one new South Sharon, Atlantic and Hall of the Republic Company in the Shenango Valley, Adrian and one Cambria in western Pennsylvania, Wellston in the Hanging Rock region, Thomas in Wisconsin, Cherry Valley, Mary, Niles and Seneca in the Mahoning Valley. In the South there were started Buena Vista, Princess and Pulaski in Virginia, Watts in Kentucky, Vanderbilt in Alabama and one Allen's Creek and Citico in Tennessee. There have

been blown out Scottdale in western Pennsylvania and Searles in Tennessee.

Monthly Pig Iron Production.

	July. (31 days)	August. (31 days)	September. (30 days)	October. (31 days)	November (30 days)
New York.....	44,095	43,200	44,725	63,701	67,735
New Jersey....	21,665	22,116	19,192	29,744	28,308
Lehigh Valley..	36,062	34,867	33,166	37,270	38,524
Schuylkill Val.	23,585	28,667	27,055	29,081	39,165
Lower Susque- hanna and					
Lebanon Val.	38,008	38,435	38,960	43,319	41,526
Pittsburgh dis.	302,266	340,053	395,324	402,880	382,316
Shenango Val...	61,708	64,374	92,273	100,557	106,326
West. Penn....	72,465	70,006	68,974	78,451	82,787
Md., Va. and					
Kentucky....	54,301	46,583	48,200	44,547	50,899
Wheeling dis..	29,249	42,784	80,279	64,401	64,117
Mahoning Val...	77,646	85,126	104,724	109,918	129,774
Cent. and No.	42,981	52,954	72,906	91,182	98,610
Hocking Valley and Hanging Rock.....	14,979	16,948	21,449	22,406	24,295
Ill., Mich., Minn., Wis., Mo. and					
Col.	165,338	172,488	184,788	199,125	192,918
Alabama.....	94,073	82,536	95,045	111,638	111,016
Tennessee, No. Carolina and					
Georgia.....	27,876	26,535	25,617	22,181	22,286
Totals.....	1,106,207	1,167,672	1,352,677	1,450,401	1,480,602

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Ashland, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of product month by month. We present also separately monthly figures of the production of spiegel-eisen and ferromanganese:

	Pig.—Total production.		Spiegeleisen and ferromanganese.	
	1903.	1904.	1903.	1904.
January.....	502,994	502,994	6,673	6,673
February.....	756,230	756,230	12,961	12,961
March.....	913,412	913,412	23,128	23,128
April.....	966,850	974,006	11,755	29,145
May.....	1,037,325	927,534	17,600	25,755
June.....	1,021,839	788,822	16,309	24,950
July.....	987,855	694,892	14,933	27,284
August.....	993,564	747,570	15,862	19,280
September.....	956,363	936,494	8,406	20,723
October.....	829,215	971,447	10,374	13,669
November.....	553,067	960,916	17,695	12,319
December.....	406,730	.....	15,394	.....

We estimate the production of the anthracite and coke furnaces monthly as follows:

Production of Coke and Anthracite Pig.

	1903.		1904.	
	Gross tons.		Gross tons.	
January (31 days).....	1,472,788	1,472,788	921,231	921,231
February (29 days).....	1,390,615	1,390,615	1,205,449	1,205,449
March (31 days).....	1,590,470	1,590,470	1,447,065	1,447,065
April (30 days).....	1,608,431	1,608,431	1,557,267	1,557,267
May (31 days).....	1,713,614	1,713,614	1,533,350	1,533,350
June (30 days).....	1,673,228	1,673,228	1,292,030	1,292,030
July (31 days).....	1,546,184	1,546,184	1,106,297	1,106,297
August (31 days).....	1,571,126	1,571,126	1,167,672	1,167,672
September (30 days).....	1,553,717	1,553,717	1,352,677	1,352,677
October (31 days).....	1,425,658	1,425,658	1,450,401	1,450,401
November (30 days).....	1,039,622	1,039,622	1,480,602	1,480,602
December (31 days).....	846,605	846,605	.....	.....

These figures do not include the production of the charcoal furnaces, which have during the first six months of 1904 averaged about 35,500 tons per month.

Stocks.

Believing that a classification of the merchant stocks by general geographical divisions would aid in a correct appreciation of the situation, we have arranged them in three groups: The Eastern, which includes New York, New Jersey and the Schuylkill, Lehigh, Lower Susquehanna and Lebanon valleys; the Central Western and Northwestern, which includes western Pennsylvania, the Shenango and Mahoning valleys, the Hanging Rock region, central and northern Ohio, and Michigan, Illinois, Wisconsin, Minnesota and Missouri, and the Southern, which includes Virginia, Kentucky, North Carolina, Georgia, Alabama and Tennessee. The stocks, of course, do not include the holdings of the steel companies:

Merchant Furnace Stocks.

	August 1.	Sept. 1.	Oct. 1.	Nov. 1.	Dec. 1.
East	104,086	104,270	96,397	88,980	78,243
Central and North-west	312,873	295,510	269,047	247,769	210,641
South	253,381	231,021	190,003	192,284	160,572
Totals	670,340	630,801	555,447	529,033	449,456

In the South some of the companies have accumulated some iron during October, while others have reduced their stock.

MANUFACTURING.

Iron and Steel.

The William B. Pollock Company, Youngstown, Ohio, builder of heavy plate construction for blast furnaces and steel works, and which will make a large addition to its plant, advises us that the greater part of the equipment and supplies for this addition has been purchased.

The United States Steel Corporation has recently placed orders for about 2100 cars. Of these about 1100 are freight cars for the Bessemer & Lake Erie Railroad, and the balance are steel cars for the corporation's ore roads in the Northwest.

The plant of the Keystone Rolling Mill at Pittsburgh is to be dismantled. It is owned by John L. and Thomas G. McCutcheon, and has been idle for several years. It was operated for a time by the Fort Pitt Iron & Steel Company, the product being muck bar and skelp.

The Liggett Spring & Axle Company, Pittsburgh, has decided to materially enlarge its spring and axle plant at Axleton, on the Monongahela River, some miles above Pittsburgh. Considerable new equipment will be installed.

The new plant of the Ohio Steel Foundry Company at Paden City, W. Va., will be put in operation shortly after January 1. The plant contains three hot sheet mills, and the receiver hopes to complete the two open hearth furnaces that are now partially built, and may also add a bar mill. The plant is located on the Ohio River and has connections with the Ohio River division of the Baltimore & Ohio Railroad. Natural gas is used for fuel and is furnished to the plant at a very low cost.

No. 2 Eliza furnace of the Jones & Laughlin Steel Company, Pittsburgh, Pa., was blown in on November 28, after being idle for several months. All five Eliza furnaces and the Soho furnace are now in operation, turning out about 2500 tons of metal per day, all of which is used in its Bessemer plant. The company has its own hot metal bridge across the Monongahela River, by which molten metal is taken direct from the Eliza furnaces to the Bessemer plant on the south side.

Frank J. Gould of New York, who controls the street railway system of Richmond, Va., has purchased the Old Dominion Iron & Nail Works, which will be operated for the production of railway material. The plant, which is equipped with puddle mill, bar mills, nail mill and other departments, is to be enlarged and machinery put in for the manufacture of additional products. No plans, however, have as yet been prepared for the improvements. Thomas S. Wheelwright, formerly connected with the Richmond Iron Works, has been appointed general manager of the Old Dominion plant.

The skelp mill of the Youngstown Iron, Sheet & Tube Company, at Youngstown, Ohio, was idle last week to make repairs. Work is being pushed on the new continuous furnace and it will be completed in about 30 days. On its completion officials of the company and Amalgamated will meet to settle the wage scale for the mill. It has never been adjusted despite repeated conferences. If the continuous furnace is successful others will be put in and the greater portion of the mill placed on a salary basis.

In November the open hearth plant at the South Sharon works of the Carnegie Steel Company, South Sharon, Pa., turned out over 29,000 tons of steel. During the greater part of the month only 8 of the 12 50-ton furnaces were in operation.

The La Belle Iron Works, Steubenville, Ohio, is installing an 84-inch plate mill. The building to contain the mill is being erected by the Riter-Conley Mfg. Company, Pittsburgh.

On Monday, December 5, five additional hot mills in the South Sharon Works of the American Sheet & Tin Plate Company, at South Sharon, Pa., were started, making a total of 15 hot mills in operation in this plant. The other five hot mills will be started within two weeks, or just as soon as enough tin bars can be secured.

The Mexican Central Railway Company, Mexico City, expects to purchase some steel rails for 1905 delivery, but as yet the quantity has not been determined.

Cedar Point Furnace of the Northern Iron Company, at Port Henry, N. Y., was blown in on November 19.

The Lehigh Iron & Steel Company's furnace at Allentown, Pa., has just blown in.

The Warner Iron Company, Cumberland, Tenn., expects to blow in its Cumberland Furnace about February, 1905.

The Susquehanna Iron & Steel Company, at Columbia, Pa., expects to blow in its furnace during March, 1905.

General Machinery.

The Southbridge Spectacle Company, Southbridge, Mass., is a new Massachusetts corporation which will establish a factory for the manufacture of spectacle frames, lenses, &c., and is in the market for a complete equipment of the necessary machine tools. A new power plant will also be installed. The company is capitalized for \$15,000, and the incorporators are Joseph Ouimette, William R. Olney and Stephen Richards, Jr., all of Southbridge.

Springer & Lister, founders and machinists, Knoxville, Tenn., are building a new foundry, 50 x 60 feet, which will be equipped with a 15-ton crane and two cupolas and a machine shop, 35 x 60 feet.

An electric crane, the specifications for which are prepared, is required by the Day-Ward Company, Warren, Ohio, which is to rebuild its foundries, recently destroyed by fire, with the expectation of occupying the new structures early in February. The new buildings will be of steel and glass construction.

To make room for the erection of another building the A. & F. Brown Company, Elizabethport, N. J., has moved its pattern storage building, 65 x 150 feet, in a portion of which is located the pattern shop, without interfering with the operation of the tools. The building was moved about 150 feet, and during the process of moving power was supplied to the wood working tools by an electric motor and the building was furnished with electric lights and steam. The steam was supplied through a temporary line, which was made up of short lengths and a rubber high pressure steam hose, and as the building moved a piece of temporary steam line was taken out and again connected up with the hose. In this way steam was kept in the building.

The Coles Machine Company, Oneida, N. Y., manufacturer of fine tools for difficult work, is installing a new shop. The machinery is practically all secured.

The William B. Scaife & Sons Company, Pittsburgh, has received a contract for the erection of a steel building to contain the forge shop of the new plant of the Driggs-Seabury Ordnance Corporation, at South Sharon, Pa. The building will be 155 feet wide by 160 feet long. The William B. Scaife & Sons Company has already erected four or five steel buildings for this concern.

Yeo Brothers, Philadelphia, Pa., a new firm consisting of Samuel P., George S. and W. S. Yeo, have recently purchased the long established business of Richard Batt & Son, 407 Columbia avenue, and will conduct at that location the general business of engineering, millwrighting, machinists and blacksmithing, their special line of manufacture being paint machinery and elevating and conveying machinery. In order to establish catalogue files, they would be pleased to receive catalogues from manufacturers of machinery and tools, as well as general machinery supplies.

Power Plant Equipment.

H. H. Sutro, A. C. Christensen and L. M. Booth, all formerly connected with Industrial Water Company, have organized the Booth Water Softening Company, for the manufacture and installation of water softening plants for railroads, industrial works, &c. Communications should be addressed to L. M. Booth, 126 Liberty street, New York.

The Interborough Rapid Transit Company, New York, is to build a new transforming station, 58 x 103 feet, on Hillside avenue near Eleventh avenue.

Foundries.

Maher & Flockhart, founders Newark, N. J., have placed an order with the Niles-Bement-Pond Company, New York, for a 20-ton and a 10-ton electric traveling crane. These cranes are to be equipped with Crocker-Wheeler motors and controllers, and the runway is being erected by the Cooper-Wygang-Cook Company.

The Kentucky Foundry Company, Eddyville, Ky., which has been in operation for two years, has incorporated with a capital stock of \$15,000. The business is controlled by J. G. Girdler, A. N. Webb, and J. W. McMullin.

It is the intention of the American Steel Foundries, New York, to increase the capacity of its plant at Chester, Pa. The detailed plans have not yet been drawn up.

The Diamond Foundry Company, Binghamton, N. Y., has been incorporated, to occupy the old Adams Foundry, for the manufacture of iron and brass castings. The directors are Fred Eltapenc, E. I. Sherman, and James Green, who will be superintendent.

The Chicago Malleable Castings Company, West Pullman, Chicago, Ill., has begun the erection of a modern pattern vault. The building will be equipped with metal clad doors and windows, with concrete roof, and will be 40 x 80 feet.

Willson M. Cary, Jr., has purchased from the receivers the bell foundry of the Henry McShane Mfg. Company, Baltimore, Md., at a cost of about \$20,000. Mr. Cary will continue the business.

Clifton Reeves, president of the Reeves Engine Company,

Trenton, N. J., and others of identified interests have organized the Reeves Foundry Company, with a capital stock of \$60,000, to make gray iron castings for the requirements of the Reeves Engine Company. The new company is now erecting a plant at Trenton, 50 x 123 feet, 18 feet under the trusses, which will be equipped with an electric traveling crane and in every way with up to date machinery.

Fires.

The hydraulic plant at Norway, Mich., owned by the Oliver Mining Company, was destroyed by fire last week. The loss is placed at over \$200,000.

The plant of the Japanese Tissue Mill Company, at South Hadley, Mass., was destroyed on December 4. The loss is about \$25,000.

The main building of the Trenton Oil Cloth and Linoleum Company, Trenton, N. J., was destroyed by fire December 2, causing a loss of \$40,000.

On December 3, a fire at Manayunk, Pa., did \$25,000 damage to the carpet yarn mill of the Freeland Mfg. Company.

The plant of the National Biscuit Company at Pittston, Pa., was damaged by fire on December 1 to the extent of \$30,000.

The shops of the Texas Midland Railway, at Terrell, Texas, were recently destroyed by fire. It is said that the three main buildings, consisting of machine shop, paint shop and car sheds, together with the machinery, were destroyed. The loss is estimated at \$50,000.

The machinery outfit of the new filtration plant at Washington, D. C., was seriously damaged by fire on November 30.

Bridges and Buildings.

The firm of Louis F. Shoemaker & Co., Philadelphia, Pa., manufacturer of steel buildings and bridges, has incorporated under the same name. Lewis F. Shoemaker is president and Thomas C. Satterthwait is secretary and treasurer. The works are located at Pottstown, Pa.

Hardware.

Atlanta Wire & Iron Works Company, Atlanta, Ga., makes a specialty of elevator inclosures, bank and office railing and window guards, and reports business exceptionally good. Quite a number of large contracts are on hand, and the outlook at present is favorable to an increased general demand throughout the Southern States.

American Window Screen Company, Philadelphia, Pa., states that from the present outlook the demand for its patented adjustable sliding screens will be such as to overtax the capacity of its plant. This company make a specialty of screens for sliding up and down the window and can supply them in stock sizes.

U. S. Washing Machine Company, manufacturer of the U. S. steel washing machine, Racine Junction, Wis., has recently made a material increase in the capacity of its plant, and is now reaching out for new business. Heretofore the factory has been kept busy filling orders which have come through personal solicitation, but now the output is such that prompt attention can be given to all orders.

The White Enamel Refrigerator Company, St. Paul, Minn., has just completed two one-story buildings. One of these is an addition to the main finishing room and enameling plant, 52 x 100 feet, and the other a separate fire proof building for storing stocks of iron, hardware and other materials.

Wheeler Screen Company, Geneva, Ill., reports a steadily growing business, to take care of which a new building, two stories and basement, 32 x 140 feet, has been added to the plant, making a total of an acre of floor space. The company manufactures window screens exclusively.

The Dent Hardware Company, Allentown, Pa., which began the manufacture of refrigerator hardware and iron toys in 1894, is now employing 200 hands. Many additions have been made to the original plant to keep pace with the developing business of the company, and next year the foundry, which was erected in the fall of 1903, will be extended so as to make a building 250 x 50 feet in dimensions.

The Dunston Wrench Company, which makes the Dunston ratchet wrench, has removed from La Crosse, Wis., to Decatur, Ill., Mr. Dunston's former home.

Miscellaneous.

C. L. Barnes, New Britain, Conn., is to erect a new shop, 20 x 40 feet and two and one-half stories, for the manufacture of chimney caps and similar lines. A part of the building will be used as a storehouse.

It is announced from Bangor, Maine, that the Eastern Steamship Company is to build two large steamers equipped with steam turbines, for use on its Boston & Bangor line. The ships will be ready for use in the early summer of 1906.

W. W. Stall, president and manager of the Factory Exchange, Boston, Mass., has leased the factory at Roxbury Crossing, which was vacated November 1 by the Bernstein Electric Company, to the R. H. Long Shoe Mfg. Company, which operates a large plant at South Framingham. The plant is to be entirely refitted with shafting, and a complete outfit of machinery is to be installed.

The York Safe & Lock Company, York, Pa., has placed contracts for the construction of its proposed new buildings, and

arrangements are being made to go ahead with the work of building. There are to be two buildings, one 63 x 188 feet, two stories high, and the other 60 x 100 feet, two stories high. Both structures will be of brick with slate roofs.

The Reo Motor Car Company, Lansing, Mich., has purchased the machinery for equipping its new plant. The orders were placed with a number of concerns.

W. L. Staley, who has the contract for the construction of the new plant of the recently organized Central Car & Foundry Company, at Vincennes, Ind., has petitioned that a receiver be appointed for the company.

The Abner Doble Company, San Francisco, Cal., has recently closed a contract with the Napa City Water Company for furnishing and erecting a new steel stand pipe. This stand pipe will be 25 feet in diameter and 100 feet high, and is to have a 30-inch balcony around the top, with an ornamental iron railing.

Lee S. Ovitt, Merrill Building, Milwaukee, Wis., is contemplating the erection of a plant, probably in Milwaukee, for the manufacture of a new typewriter. The machine departs radically from present practice, the main difference being that the carriage, instead of moving transversely across the frame, will revolve, a complete revolution of this cylindrical carriage being made for each line. This obviates the long lateral adjustment from the end of one line to the beginning of the next; the only adjustment necessary is the small drop—in this case a lateral movement—from the level of one line to the next one below. The plant will cost \$20,000 or more, but the promoters have not yet reached the point of taking up its details.

Antonio C. Pessano, president and general manager of the Great Lakes Engineering Works, Detroit, Mich., announces that his company has taken over the plant of the newly organized St. Clair Engineering Company, St. Clair, Mich., which was formerly operated by the Columbia Iron Works, and will complete the construction of the two modern freighters for the Gilchrist Transportation Company, which were just about started when the Columbia Iron Works went out of existence. The boats are to be 464 feet keel, 50 feet beam, and will be equipped with four Scotch boilers and triple expansion engines. With the acquisition of the shipyard at St. Clair the Great Lakes Engineering Company will have two modern shipyards and an engine plant.

The Drought in Pennsylvania.—ALTOONA, PA., December 6, 1904.—(By Telegraph.)—Throughout central and northern Pennsylvania the lack of water is seriously impeding industry, and unless the present drought is soon terminated so that sufficient water can be had for the operation of their boilers, manufacturing and industrial establishments will be in a quite helpless condition. At Altoona this state of affairs is very marked and as a result the great locomotive car and repair shops of the Pennsylvania Railroad Company were shut down at noon to-day. This happens at a very inopportune time, for the shops are needed most urgently at present to furnish adequate equipment for the movement of coal. The coal operators are already complaining that they cannot operate their mines and fill contracts for the want of sufficient rolling stock to make shipments. Locomotives urgently in need of repairs are being rushed to the Baldwin Works at Philadelphia to be placed in fit condition for operation. Forty locomotives were sent yesterday and an order for 25 new engines has just been placed with the Baldwin Works. It is believed that an arrangement will be made with the Pressed Steel Car Company for the repair of cars needed now most urgently. Every effort is being made by the railroad company to relieve the distressing situation. All the available water to be had from the springs and creeks within a radius of several miles is being piped to Altoona with all possible speed. A fairly ample supply is available within 3½ miles of the works in a stream called Tipton Run, but the railroad officials and the municipality are crossing legal swords over their respective rights, as both are desirous of obtaining the water of the stream. If the railroad is not hampered by the city it can deliver the water to its shops within two weeks. The shops closed were the machine shops, the car shops and the Juniata locomotive shops.

Fred W. Ange, formerly private secretary to Thomas McDonald, superintendent of the Ohio Works of the Carnegie Steel Company, at Youngstown, has been made general superintendent of the North Works, an open-hearth plant of the Carnegie Steel Company, at Sharon, Pa.

Proposed New Organization of Workmen in the Building Trades.

The builders and contractors of New York City are watching with some solicitude a movement toward the formation of what is aimed to be the largest central body of workmen in the building trades that has yet been organized. The object of the promoters of the new Building Trades Board is to bring together in one body all wage earners in the building trades, both skilled and unskilled, with the view of presenting a united front to the employers' organization. To carry this movement to a successful issue, however, would seem to be a herculean task, owing to the internal dissensions which prevail among the various unions. Yet it is claimed that a substantial foundation for the organization has already been laid and committees are at work on the preliminaries, whose efforts are being directed primarily toward smoothing over the mutual antagonisms that exist between a number of the old unions and those new unions which have been formed in the past year or so to work in harmony with the Building Trades Employers' Association. This bitterness must be removed before any central organization can be established on a secure basis. It is planned to have the new organization in working shape before May 1, on which date a number of the agreements between the unions and the employers expire. It is announced that one of the first objects to be taken in hand by the proposed central body will be a revision of the arbitration plan under which a number of unions are now operating with the Employers' Association. It is claimed that the arbitration plan as now existing works out almost exclusively in favor of the employers and is too one sided. Another aim is to resist the movement toward the open shop. This, the union leaders think, will not be difficult, as the New York Employers' Association has not shown any special leaning toward the open shop, but rather seems to prefer to work in harmony with the unions on a closed shop basis.

Leading members of the Building Trades Employers' Association who have been interviewed on the subject of the proposed new central body of workmen are generally of the opinion that the internecine strife and jealousies which prevail among the various unions in the building trades will make it difficult, if not impossible, to successfully carry out the plan for one great organization which will embrace all the trades that have connection with building operations. Nevertheless, a meeting of the new Building Trades Board was held last Sunday in New York City, at which 170 delegates, representing 34 unions, signed its roster of membership. These delegates, it is claimed, represented more than 70,000 men connected with the building trades, which is a larger number than formed the constituency of the old building trades organization under the leadership of Sam Parks and his successor, Philip Weinseimer. The unions that are claimed to be ready to affiliate with the new central body, with their membership, are as follows:

Amalgamated Sheet Metal Workers, 2500; Cement and Asphalt Workers' Union, 1200; Compact Labor Club of Marble Cutters' Helpers, 1200; District Council Housecarpenters and Bridgemen's Union, 6000; Brotherhood of Plumbers, 6000; Brotherhood of Carpenters and Amalgamated Carpenters' Society, 14,500; Enterprise Association of Steam Fitters, 2800; Progress Association of Steam Fitters' Helpers, 1200; Empire Marble Cutters and Setters' Union, 900; House Shorers and Movers' Union, 600; Mosaic and Encaustic Tile Layers' Union, 700; Tile Layers' Helpers' Union, 700; Electrical Workers' Union, 2300; Local 15, International Association of Machinists, 4000; Journeymen Bluestone Cutters' Union, 1800; Journeymen Plumbers' Unions Nos. 1 and 2, 3900; Local 46, Wood, Wire and Metal Lathers, 100; Double Drum Hoister Runners' Union, 800; National Alliance of Painters and Decorators' Local 28, 4500; Plasterers' Society, 2500; Plasterers' Laborers' Union, 1700; Reliance Labor Club of Marble Cutters, 1500; Sign Painters' Union, 400; Salamander Association of Pipe and Boiler Coverers, 600; Tar, Felt and Waterproof Workers, 600; United Cement Masons' Union, 2000; United Portable and Safety Engineers, 1800; United Lumber and Iron Handlers, 1000; United Portable Hoisting Engineers (new union), 400; Wood, Wire and Metal Lathers' Union, 800; Whitestone Association of Marble Polishers, 1800; Wood Carvers and Modelers' Union, 500.

In this list are rival unions in the same trades. In this connection the statement is made that, prior to a permanent organization being effected, these warring

unions must settle their differences and unite in order to become members of the central body.

Concentration of Navy Yard Power Plants.

WASHINGTON, D. C., December 6, 1904.—An interesting report has been made to the Navy Department by Messrs. Stone and Webster, the well-known electrical engineers and experts of Boston, upon a problem recently submitted to them by Secretary Morton concerning the concentration of the light and power plants now in use at the various navy yards and the provision that should be made for reserve power in each yard.

As to the power producing capacity of the yard the engineers report that it is larger than smaller industrial establishments, for two reasons: First, because the multiplicity of power plants necessitates sufficient capacity in each to carry individual maximum loads greater in proportion than would be required if all power production were concentrated at one point; and, second, because the duplication of shops of the same character, such as smitheries, joiners' shops, machine shops, &c., requires a larger power plant installation than if all work of the same character were performed at one point instead of at several.

The various kinds of power and miscellaneous service capable of concentration for which provision is now made at the various yards may be denoted as follows: 1, Production of electricity for power and light; 2, pneumatic power; 3, hydraulic power; 4, live steam; 5, heating of buildings by steam or hot water, and 6, fire protection. At the larger yards the experts found three, and in some cases four, separate and distinct power plants ranging in size from 100 to about 2000 horse-power. Furthermore, the existing plants at a number of yards have been so designed and installed, by intent or otherwise, as practically to prevent interchange of electric power between departments, one department using alternating current and another direct, or one using alternating current of a certain character and another alternating current of a different character. As a ship under repair will generally have work for every department represented on it, a breakdown of any one of the present numerous power plants would delay the completion of the work as much as any probable accident to a properly designed central power plant.

Conclusions and Recommendations.

The conclusions and recommendations of the engineers, in view of these conditions, are in part as follows:

Our study of the conditions under which the present power supply is produced warrants the conclusion that the yearly cost of power in a central plant should be less than the present costs by the following amounts:

Portsmouth	\$20,000
Boston	25,000
New York	30,000
League Island	18,000
Norfolk	15,000

Total

We estimate the expenditure required to effect these reductions should not exceed:

Portsmouth	\$250,000
Boston	250,000
New York	450,000
League Island (net)	75,000
Norfolk	250,000

Total

The following recommendations are made:

That the operation of the consolidated plant be placed on a central station basis—that is, it should be ready at all times, day and night, to furnish an ample supply of power to any department—and should be placed in charge of men experienced in commercial central station operation, as undoubtedly a large part of the opposition that has developed to a consolidated plant is the apprehension of the different departments that they will be handicapped in their work by an inefficient or insufficient power supply and that it will be impossible to get emergency overtime power. This feeling, which is due to the present method of handling interdepartment business, with its attendant delays, will make it necessary to so change the department regulations as to make it possible for any department head to call directly upon the power producing department for such power and at such times as he may need it.

Other recommendations apply to central heating plants, the use of individual motors, the use of fuel oil, &c.

W. L. C.

The Iron and Metal Trades

Our monthly blast furnace statistics foreshadow a very large production of pig iron at an early date. Capacity has increased from 334,000 gross tons on November 1 to 357,000 tons on December 1, and since the opening of the current month there have been further additions. Preparations are going on in different parts of the country for resumption. The United States Steel Corporation will at the opening of the year have practically its entire capacity in operation, there having been blown in lately idle furnaces in the Pittsburgh and the Wheeling districts.

During the past month the Steel companies made 960,626 gross tons in 30 days, as compared with 971,447 tons in 31 days in October. The merchant furnaces produced 478,954 tons in October and 519,976 tons in November, and, taking into account the reduction in stocks, the shipments were 599,553 tons in November, as compared with 505,368 tons in October, which further compares with 459,641 tons in August. In other words, general consumption has increased by 140,000 tons per month since August.

With the Steel works consuming 1,000,000 tons per month and the merchant furnaces shipping 600,000 tons, and the charcoal furnaces making at least 30,000 tons per month, we are now using fully 19,500,000 tons of Pig Iron per annum—a startling change when we make comparisons with the condition of affairs a year ago. When it is considered that we are approaching what is ordinarily regarded as the slackest season of the year, the conclusion seems warranted that there is a year of full work before us.

There has been some very heavy buying of Basic Pig in the East, sales for the week to Steel works in New England, New York and eastern Pennsylvania footing up 65,000 tons, which was placed on the basis of around \$15 at furnace.

A sharp demand for spot Bessemer and Basic has developed in the Central West and one lot of 10,000 tons of Bessemer Pig has been sold to a Canadian Steel plant.

In the Eastern markets fully 30,000 tons of Foundry Iron have been purchased by Cast Iron Pipe founders, and approximately 50,000 tons of Foundry Pig have been taken by one interest in the Central West. As a result the markets are very firm with an advancing tendency and an increasing number of sellers quoting higher prices.

The demand for the intermediate products is heavy and prices are higher in Muck Bars, Wire Rods and Skelp, and are tending upward in Billets and Sheet Bars.

It is regarded as an almost foregone conclusion now that prices on Finished Iron and Steel will be higher. This applies to the heavier lines like Shapes and Plates, which it is expected will be advanced at the forthcoming meeting on December 20. It is also likely in the case of Wire products, Tubes, Sheets and Tin Plates, while in Bars premiums over the official prices are now almost universal.

The Steel Rail makers have already booked considerable orders for 1905 delivery, and it is expected that when next week the official announcement that \$28 is to be the price is made a large tonnage will be placed.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

PIG IRON:	1904. Dec. 6,	1904. Nov. 30,	1904. Nov. 9,	1903. Dec. 3,
Foundry Pig No. 2, Standard.				
Philadelphia	\$16.50	16.50	15.50	15.00
Foundry Pig No. 2, Southern,				
Cincinnati	15.75	15.75	15.00	12.00
Foundry Pig No. 2, Local, Chicago	16.50	16.00	15.50	14.25
Bessemer Pig, Pittsburgh.....	16.35	16.35	14.85	14.60
Gray Forge, Pittsburgh.....	15.85	15.85	13.85	12.50
Lake Superior Charcoal, Chicago	17.50	17.00	16.50	16.50

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh.....	21.00	21.00	19.50	23.00
Steel Billets, Philadelphia.....	25.00	24.50	22.00	24.25
Steel Billets, Chicago.....	24.00	24.00	22.50	24.00
Wire Rods, Pittsburgh.....	31.00	28.00	27.00	31.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago.....	14.50	15.00	14.00	10.75
O. Steel Rails, Philadelphia....	16.50	16.00	14.25	11.75
O. Iron Rails, Chicago.....	22.00	22.00	19.50	13.90
O. Iron Rails, Philadelphia....	20.50	18.50	17.00	16.00
O. Car Wheels, Chicago.....	16.00	15.50	13.50	13.00
O. Car Wheels, Philadelphia....	14.50	14.00	13.75	12.75
Heavy Steel Scrap, Pittsburgh..	16.00	16.00	14.50	11.00
Heavy Steel Scrap, Chicago....	14.00	14.00	11.75	9.00

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia.	1.53½	1.53½	1.43½	1.35
Common Iron Bars, Chicago...	1.65	1.55	1.45	1.35
Common Iron Bars, Pittsburgh.	1.54½	1.54½	1.39½	1.34½
Steel Bars, Tidewater.....	1.44½	1.44½	1.44½	1.44½
Steel Bars, Pittsburgh.....	1.30	1.30	1.30	1.30
Tank Plates, Tidewater.....	1.54½	1.54½	1.54½	1.78
Tank Plates, Pittsburgh.....	1.40	1.40	1.40	1.60
Beams, Tidewater.....	1.54½	1.54½	1.54½	1.73½
Beams, Pittsburgh.....	1.40	1.40	1.40	1.60
Angles, Tidewater.....	1.54½	1.54½	1.54½	1.73½
Angles, Pittsburgh.....	1.40	1.40	1.40	1.60
Skelp, Grooved Steel, Pittsburgh	1.40	1.40	1.40	1.45
Skelp, Sheared Steel, Pittsburgh	1.50	1.50	1.45	1.55
Sheets, No. 27, Pittsburgh....	2.10	2.10	2.00	2.30
Barb Wire, f.o.b Pittsburgh...	2.15	2.15	2.05	2.50
Wire Nails, f.o.b Pittsburgh....	1.70	1.70	1.60	1.90
Cut Nails, Mill.....	1.70	1.70	1.60	1.90

METALS:

Copper, New York.....	14.87½	14.87½	13.87½	12.25
Spelter, St. Louis.....	5.70	5.55	5.20	4.60
Lead, New York.....	4.60	4.60	4.45	4.10
Lead, St. Louis.....	4.52½	4.40	4.22½	4.02½
Tin, New York.....	29.12½	29.80	29.00	27.00
Antimony, Hallett, New York..	9.00	9.00	7.25	6.25
Nickel, New York.....	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer,				
100 pounds, New York.....	3.64	3.64	3.49	3.79

Chicago.

FISHER BUILDING, December 7, 1904.—(By Telegraph.)

It is evident that the forces which have been supporting and advancing the market are not through with their efforts. The perceptible wave of weakness which characterized last week's trading has given way to a new strength, and Pig Iron prices show either absolute advances or a much firmer tone at old prices. The idea is prevalent that there is a good deal of manipulation under the market and that fictitious strength is being given to Pig Iron, particularly in order to justify the reaffirmation of the present price on Standard Section Rails, and that as soon as the Rail prices are announced the forces under the market will retire, having accomplished the purpose for which they have been laboring the last few months, leaving the market to sag to a point where it is more in proportion to the actual consumptive demand. As against that theory statements are made with the greatest emphasis that immediate specifications and orders on the part of consumers are of such volume as to justify the present prices of raw materials and to warrant marked advances in finished products. Both Cambria and the Republic are practically out of the market on Steel Bars, as they are holding their prices 10c. above the official 1.30c. basis, each stating that it has already booked so large a tonnage that it cannot take more and do justice to its customers. Iron bars have advanced to 1.65c. One of the two leading factors in local Northern Pig Iron has withdrawn from the market altogether, making nominally a minimum price of \$17.50, Chicago, while the other factor, which still has some Iron to sell, has raised its price to a minimum of \$16.50, Chicago. Southern Iron is firm at the \$13.50, Birmingham, basis, with some trading being done at 25c. to 50c. a ton higher. Two new bank buildings in Chicago, the Corn Exchange and Northern Trust, will each

require from 2000 to 2500 tons of Structural Steel, and a large number of other downtown structures are being figured on. Structural Steel is probably the most active commodity in to-day's market, and buyers are evincing a disposition to cover before prices are advanced. It is difficult to epitomize the Sheet proposition except to say that prices are strong at the advances noted last week and that more Sheets are being sold at higher than official prices. Plates, Pipe, Tubes and other finished products show considerable strength, but there is nothing phenomenal in the trading. The upward movement in Scrap Iron has been checked and some of the lines have slumped off 50c. to \$1. The Iron and Steel trade is looking forward with much interest to announcements to be made by association meetings to be held shortly.

Pig Iron.—Of the two leading factors in local Northern Foundry Iron one has withdrawn from the market altogether, announcing nominally the prohibitive price of \$17.50, and the other has advanced his minimum to \$16.50, stating that only large regular customers will be given that price and that the majority of quotations will be on the basis of \$17, Chicago, for No. 2. Southern Irons are strong at \$13.50, Birmingham, and sales are being made on that basis. The statement is made by some producers that they have been able to secure \$13.75 and \$14 at Birmingham for shipment not only in the Southern territory, but into the North as well, some of the higher prices being for spot delivery and some for first and second quarters of 1905. A large volume of business was booked in this market on Northern Iron last week and a larger tonnage of Southern than any one expected. The following are the prices that are quoted either for delivery this year or the first quarter of the next, car lots or greater, f.o.b. Chicago:

Lake Superior Charcoal.....	\$17.50 to \$18.00
Northern Coke Foundry, No. 1.....	17.00 to 17.50
Northern Coke Foundry, No. 2.....	16.50 to 17.00
Northern Coke Foundry, No. 3.....	16.00 to 16.50
Northern Scotch, No. 1.....	17.50 to 18.00
Ohio Strong Softeners, No. 1.....	18.30 to 18.80
Ohio Strong Softeners, No. 2.....	17.80 to 18.30
Southern Silvery, 4 to 6 per cent. Silicon.....	18.15 to 19.15
Southern Coke, No. 1.....	17.65 to 17.75
Southern Coke, No. 2.....	17.15 to 17.25
Southern Coke, No. 3.....	16.65 to 16.75
Southern Coke, No. 4.....	16.40 to 16.50
Southern Coke, No. 1 Soft.....	17.65 to 17.75
Southern Coke, No. 2 Soft.....	17.15 to 17.25
Southern Gray Forge.....	16.15 to 16.25
Southern Mottled and White.....	15.90 to 16.00
Malleable Bessemer.....	16.00 to 16.50
Standard Bessemer.....	17.80 to 18.30
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	19.30 to 20.30
Jackson County and Kentucky Silvery, 10 per cent. Silicon.....	21.30 to 21.80
Alabama Basic.....	17.15 to 17.25
Virginia Basic.....	16.40 to 16.65

Sheets.—The market is strong on the basis of 2.20c., Pittsburgh, for No. 28, and some mills are asking 50c. to \$1 a ton higher. Evidently the recent advances made on Black and Galvanized Sheets are having the desired effect, as they are stimulating buying rather than discouraging it. We quote, Chicago, car lots, on the blue annealed and box annealed Sheets: Nos. 9 and 10, 1.76½c.; Nos. 11 and 12, 1.81½c.; Nos. 13 and 14, 1.86½c.; Nos. 15 and 16, 1.96½c.; Nos. 18 and 20, 2.11½c.; Nos. 22 and 24, 2.16½c.; Nos. 25 and 26, 2.21½c.; No. 27, 2.26½c.; No. 28, 2.36½c.; No. 29, 2.46½c.; No. 30, 2.56½c. Chicago store prices have been advanced, but there is no longer any agreement or community of interests between jobbers, each naming such prices as seems to fit the individual case in point. In some cases there is 15c. to 20c. spread between the minimum and maximum prices charged out of store. This spread is particularly noticeable on the light gauges. With this explanation we make the following quotations: Black Sheets, No. 10, 1.95c. to 2.05c.; No. 12, 2c. to 2.10c.; No. 14, 2.15c. to 2.25c.; No. 16, 2.25c. to 2.35c.; No. 18, 2.35c. to 2.45c.; No. 20, 2.40c. to 2.50c.; Nos. 22 and 24, 2.45c. to 2.60c.; No. 26, 2.50c. to 2.65c.; No. 27, 2.55c. to 2.70c.; No. 28, 2.70c. to 2.85c. Galvanized Sheets are strong at last week's prices in carload lots, f.o.b. Chicago, as follows: No. 16, 2.51½c.; Nos. 18 and 20, 2.66½c.; Nos. 22 and 24, 2.81½c.; No. 26, 3.01½c.; No. 27, 3.21½c.; No. 28, 3.41½c. These prices are equivalent to about 80 and 5 per cent. discount at Pittsburgh. Store prices range from 75 per cent. discount to 75 and 5 and as low as 75 and 10 at Chicago warehouse.

Old Material.—Consumers have succeeded in making noticeable inroads on this market by flatly refusing to pay the fancy prices asked by dealers. In other words, the market advanced too rapidly to maintain its strength, and this week's prices show a number of 50c. and \$1 reductions compared with last week. As a matter of fact, the three large consumers in the West are pretty well stocked and are buying little or nothing at the present prices, and dealers who for several months have been bidding up prices are showing some alarm at the new turn of affairs. However, the new strength in Pig Iron is expected to give fresh support to Old Material and prevent a positive break. In the following prices the higher figures are about those asked by dealers from consumers, and the lower the dealers' buying prices

from railroads and each other. We quote as follows, per gross ton:

Old Iron Rails.....	\$22.00 to \$22.50
Old Steel Rails, 4 feet and over.....	15.50 to 16.00
Old Steel Rails, less than 4 feet.....	14.50 to 15.00
Heavy Relaying Rails, subject to inspection.....	22.00 to 22.50
Heavy Relaying Rails, for side tracks.....	20.00 to 20.50
Old Car Wheels.....	16.00 to 16.50
Heavy Melting Steel Scrap.....	14.00 to 14.50
Frogs, Switches and Guards.....	14.00 to 14.25
Mixed Steel.....	10.00 to 10.50

The following quotations are per net ton:

Iron Fish Plates.....	\$19.00 to \$19.50
Iron Car Axles.....	22.00 to 22.50
Steel Car Axles.....	16.50 to 17.00
No. 1 Railroad Wrought.....	17.00 to 17.50
No. 2 Railroad Wrought.....	16.00 to 16.50
Shafting.....	17.50 to 18.00
No. 1 Dealers' Forge.....	14.00 to 14.50
Wrought Pipes and Flues.....	12.50 to 13.00
Iron Axle Turnings.....	11.50 to 12.00
Soft Steel Axle Turnings.....	11.50 to 12.00
Machine Shop Turnings.....	11.00 to 11.50
Cast Borings.....	7.50 to 8.00
Mixed Borings, &c.....	7.50 to 8.00
No. 1 Mill.....	9.50 to 10.00
Country Sheet.....	8.50 to 9.00
No. 1 Boilers, cut to Sheets and Rings.....	11.50 to 12.00
No. 1 Cast Scrap.....	14.00 to 14.50
Stove Plate and Light Cast Scrap.....	11.50 to 12.00
Railroad Malleable.....	13.00 to 13.50
Agricultural Malleable.....	12.00 to 12.50

Metals.—Pig Lead has advanced 35c. per 100 lbs. and is now quoted at 4.55c. for 50-ton lots, 4.65c. for car lots and 4½c. to 5c. for small lots, but it is extremely difficult to get at any price. Casting Copper is unchanged but strong at 15c. to 15½c. and Lake 15½c. to 15¾c. Pig Tin is firm at 31c. to 31½c. Spelter is quoted at 4.65c. in car lots and 4.75c. in smaller lots. Sheet Zinc is unchanged at 6.65c., Chicago, in car lots of 600-lb. casks, and ¼c. to ½c. higher for small lots. Old Copper is ¼c. higher, as are also Red Brass Borings and Light Brass. Zinc has advanced ¼c., Pewter No. 1 1c. and Block Tin Pipe 1c. We quote: Copper Wire and Heavy, 13¼c.; Copper Bottoms, 12¼c.; Copper Clips, 12¾c.; Red Brass, 12c.; Red Brass Borings, 10¼c.; Yellow Brass, Heavy, 9c.; Yellow Brass Borings, 8½c.; Light Brass, 7½c.; Lead Pipe, 4.25c.; Tea Lead, 4.10c.; Zinc, 4½c.; Pewter No. 1, 19½c.; Block Tin Pipe, 26c.

(By Mail.)

Billets.—The market is strong, with talk of an advance in prices in the near future. Buyers are covering their needs as far into the future as sellers will permit, the usual limit being January 1, with here and there contracts closed, it is said, covering the first quarter. The Steel department of the Illinois Steel Company at South Chicago is still idle, with no immediate prospect of resumption. Prices are unchanged, as follows: Bessemer Rolling Billets, 16 square inches in section and larger, up to but not including 100 square inches, \$24 per gross ton, Chicago; 100 square inches, up to but not including 400 square inches, \$26; 400 square inches and larger, \$30. Open Hearth Forging Billets \$26 a gross ton for sections 16 square inches, up to but including 100 square inches; Billets smaller than 16 square inches in section or 100 square inches and larger, \$28; Axle Billets, \$28. Less than car lots, \$2 extra.

Rails and Track Supplies.—The president of the Rock Island road has announced that his company would buy 150,000 tons of Standard Section Rails in 1905, no matter what the price, and that many other trunk lines were in the same position. The Rail situation is strong and there is less and less likelihood of a reduction of price from the present \$28 basis at the long deferred but soon due meeting of the Rail pool. Present specifications, however, are extremely light, so much so that the Rail mill of the Illinois Steel Company is still idle. Demand for Light Section rails continues to be active at from \$22 to \$24 per gross ton at mill. Angle Bars rule at from 1.30c. to 1.35c.; Spikes from 1.65c. to 1.70c.; Track Bolts have advanced, now being quoted at from 2.30c. to 2.35c., with Square Nuts and about 2.50c. with Hexagon Nuts. Store prices on Angle Bars, Track Bolts and Spikes are from 15c. to 20c. above mill prices.

Structural Material.—The Corn Exchange National Bank has decided to erect a 16-story bank and office building instead of a three-story bank building, as at one time proposed, and will require perhaps 2000 tons of Structural Steel. Shepley, Rutan & Coolidge are architects. Railroads are more and more in evidence as buyers of Steel bridges, which in many instances can be erected more advantageously in winter than in summer, as false work can usually be erected on the ice. Jobbers in Structural Steel are particularly active in specifying against contracts, and this is only one of many indications that higher prices will prevail before spring. Official prices, which will not be quoted on contracts extending beyond shipment the end of next June, are as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.56½c., Chicago; Angles, 3 to 6 inches, ¼-inch and heavier, 1.56½c.; Angles, larger than 6 inches on one or both

legs, 1.66½c.; Beams, larger than 15 inches, 1.66½c.; Zees, 3 inches and over, 1.56½c.; Tees, 3 inches and over, 1.61½c., with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices on Structural Materials are 1.80c. to 1.90c. for Angles, Beams, Channels and Zees, base sizes, with 1.90c. to 2c. for 18, 20 and 24 inch Beams; Tees, 1.85c. to 1.95c. These prices are for either random lengths or cut to lengths.

Plates.—A better feeling prevails than during last week's breathing spell and specifications are again coming in with fair activity. They are still far short of aggregating sufficient tonnage to permit Western mills to run economically. The Illinois Steel Company has resumed work in its South Chicago Plate mill, with orders on its books for Ship Plates for two big Steel freighters to be built at South Chicago for the United States Steel Corporation, besides a large miscellaneous tonnage. Mills refuse to enter into contracts at present prices beyond June 30, 1905. Official prices are unchanged, as follows: Tank quality, ¼-inch and heavier, wider than 24 and up to 100 inches wide, carloads, Chicago, 1.56½c.; 3-16 inch, 1.66½c.; Nos. 7 and 8 gauge, 1.71½c.; No. 9, 1.81½c.; Flange quality, any width up to 100 inches, 1.66½c.; Sketch Plates, in Tank quality, 1.66½c.; in Flange quality, 1.76½c. Store prices on Plates are as follows: Tank Plates, up to 100 inches wide, ¼-inch and heavier, 1.80c. to 1.90c.; 3-16 inch up to 72 inches wide, 1.90c. to 2c.; No. 8, up to 60 inches wide, and No. 10, up to 48 inches wide, 1.90c. to 2c.; lower gauges are quoted under the headings of Sheets. Beyond the base widths named extras from 10c. to 25c. per 100 lbs. are charged for wider widths; Flange quality is usually charged at 25c. extra.

Bars.—Iron Bars show another advance and are now quoted at 1.65c., base, half extras, Chicago, in car lots from mill. Makers of freight cars, who prefer Iron to Steel, are about the only large users who are buying Iron Bars at this unusual premium over Steel. Soft Steel Bars and Bands are unchanged in their official price of 1.30c., base, Pittsburgh, or 1.46½c., base, half extras, Chicago, in car lots from mill. Heavy specifications continue to come from all quarters, and Bar users generally are buying up to their maximum necessities as insurance against an advance that is looked for in the near future. The Republic Iron & Steel Company and the Cambria Steel Company are both out of the market on Steel Bars for the present, as they are quoting \$2 a ton higher than association prices and do not desire further business at association figures. The International Harvester Company is understood to be quoting full association prices and to be getting some tonnage of Soft Steel Bars and Shapes on that basis. Steel Hoops are unchanged at 1.55c. rates, full extras, Pittsburgh, or 1.71½c., Chicago, in car lots. Store prices on Iron Bars have advanced 10c. to 15c., and are now 1.85c. to 1.95c., base, full extras. Soft Steel Bars and Bands are unchanged at 1.60c. to 1.70c., base, half extras; Soft Steel Angles, Channels and Tees at 1.75c. to 1.80c., half extras; Soft Steel Hoops, 2c. to 2.10c. rates, full extras.

Merchant Steel.—The gradually advancing prices in raw materials and the necessity of raising prices on finished products before long are leading consumers of Merchant Steel to specify actively on contracts and to ask mills to raise the maximum figures when they are not deemed sufficient to cover probable requirements up to next July. Prices are unchanged, as follows: Bessemer and Open Hearth Spring Steel to general trade, 1.85c. to 1.90c.; Smooth Finished Machinery Steel, 1.71½c. to 1.76½c.; Smooth Finished Tire, 1.66½c. to 1.71½c.; Flat Sleigh Shoe, 1.51½c. to 1.56½c.; Concave and Convex Sleigh Shoe, apparently unchanged at 1.66½c. to 1.71½c.; Cutter Shoe, apparently unchanged at 2.25c. to 2.30c.; Toe Calk Steel, 2.01½c. to 2.06½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots; Railway Spring, carload lots, 1.63c. to 1.71½c., with reduction for larger quantities.

Merchant Pipe.—As Skelp advances in price there is less and less disposition on the part of independent Pipe mills to offer lower prices or to accept long time contracts at present figures. The widely published \$2 advance noted in commercial dailies was a myth, and the leading producers as well as independents are still quoting current prices for nearby deliveries. Discounts to consumers in car lots for shipment from mill, f.o.b. Chicago, are unchanged, as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
½ to ¾ inch.....	67.35	51.35	65.35	49.35
¾ to 1 inch.....	71.35	59.35	69.35	57.35
1 to 2 inches.....	75.35	65.35	73.85	63.85
2 to 12 inches.....	70.35	55.35	68.85	53.35
Extra strong, plain ends, ½ to ¾ inch.....	60.35	48.35	58.35	46.35
¾ to 1 inch.....	67.35	55.35	65.35	53.35
1 to 2 inches.....	63.35	51.35	61.35	49.35
Double extra strong plain ends, ½ to ¾ inch.....	56.35	45.35	54.35	43.35

Boiler Tubes.—The following are the official discounts named by the leading producer for less than car lots from mill, Chicago delivery. Car lots are purchasable at at least two points better discount. Prices, particularly on Iron Tubes, are frequently shaded:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches.....	44.35	41.35	52.35
1½ to 2¼ inches.....	56.35	41.35	40.35
2¼ inches.....	58.35	46.35	43.35
2¾ to 5 inches.....	64.35	53.35	up to 4 in. 50.85
6 to 13 inches.....	56.35	41.35	....

Store prices on Boiler Tubes have not advanced, and the following schedule is fairly well maintained:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches.....	42½	37½	40
1½ to 2¼ inches.....	52½	35	37½
2¼ inches.....	55	37½	40
2¾ to 5 inches.....	62½	47½	47½
6 inches and larger.....	52½	..	..

Coke.—Prices on strictly 72-hour Connellsville Foundry range from \$5.15 to \$5.40 in car lots, Chicago. Coke from other districts paying the same \$2.65 freight is offered at \$4.65 to \$4.90. Wise County Cokes are quoted at \$4.50 to \$4.75, which, with their \$2.25 freight rates, makes them \$2.25 to \$2.50 at the ovens.

Philadelphia.

FORREST BUILDING, December 6, 1904.

The Iron and Steel markets maintain an extremely strong appearance, although there are some indications that buyers are pretty well filled up. The optimistic spirit is so great, however, that the midwinter holidays may pass without the usual reaction, although there will perhaps be less activity and probably a slight recession in prices before next year's business is taken up. There is a general conviction that the country is on the verge of an extraordinary industrial development and that manufacturing facilities will at no distant date be taxed to the utmost, under which feeling people are ready to buy almost anything. From one point of view this is a gratifying feature, but it has its drawbacks, which is manifested by the fact that specifications are by no means prompt, and some mills are declining to accept any business at all unless accompanied by immediate specifications. The same feature is to some extent met with in Pig Iron, which is not taken in a way that indicates any great rush of business. As a matter of fact, much of the buying is for forward deliveries, which will probably prove to be all right, but when so many transactions are made and so few are ready to accept shipments it is certainly something very unusual. Ordinarily it would be concluded that the orders were purely speculative, but even the most conservative people have so much faith in better times that they merely note the peculiarity without changing their opinion in regard to the ultimate outcome. At the same time the initial movement was so sudden and the advance in prices so rapid that there is a natural desire to investigate the why and the wherefore of things. It may seem ungracious to question what is generally accepted as unmistakable evidences of returning prosperity, yet, to say the least, the features referred to are not conducive to the most complete confidence. It must be borne in mind that in case of need there is a large capacity that could be put in operation, and it only requires a little more demand to make an important addition to the output. The apparent scarcity at the present time and the tendency toward higher prices are therefore liable to be somewhat misleading, and many conservative people would be rather pleased to see things slow down for a while, until a thorough examination can be made in regard to what the actual requirements during 1905 are likely to be. This, of course, involves the question of prices, which must necessarily be an unknown quantity until the volume of supply and demand can be estimated. Buyers act as though there would not be enough material to go around, yet they are fully covered for the next 12 to 16 weeks; yet there are very few that would not be glad to extend their lines. There is no urgency for immediate deliveries, however, and no premiums paid on anything, so that it is difficult to avoid the conclusion that there is a considerable element of speculation in many of the purchases. This being the case, it is not unfair to conclude that the business situation is in danger of being regarded too optimistically. If there was all the improvement claimed, why are not deliveries more urgently called for? In this territory, at any rate, buyers can get anything they want on the shortest notice possible, yet there are many cases in which orders are declined simply because deliveries are not specified, or if specified the date is too far off to be satisfactory to the seller. The conclusion that many have arrived at is that there is a great "speculation in futures." The outlook is good and there is a general belief that 1905 will be a great year for the Iron trade, but conditions at the moment do not warrant further advances

in prices or extended operations even at present prices. A correct estimate of supply and demand during the coming year and an adjustment of prices in proportion are the needs of the hour, but these appear to be almost out of the question while the general feeling is as optimistic as it is at the present time.

Pig Iron.—The Pig Iron situation is hard to define, because there are hardly any two people who are of the same mind, besides which circumstances vary to a greater extent than usual. Prices have made new records, and while there has not been enough business done at over \$17 for No. 2 X Foundry to make it a fair quotation, yet there are very few that would sell at less than that to-day, while some ask a trifle more. But sellers think that buyers have got all the Iron they are entitled to, and if they insist on having more they must pay the price. In cases in which buyers take what they need month by month without special agreement in regard to price, they would probably get their Iron at \$16.50, but it would depend on circumstances. Mill Irons are more scarce than ever, and sales have been made at as high as \$16.25, delivered. The supply is so limited that prices are hardly quotable—it might be \$15.75 or \$16, or in case of urgency more than \$16.25 might have to be paid. There is no uniformity, and prices would depend entirely on circumstances. The market will probably work easier within the next few weeks, as a number of furnaces are being put in operation, and by the middle of January it is believed that the supply will be ample for all requirements. Coke and Ores are scarce, and it is said that it will be difficult if not impossible to increase the output of Pig Iron until toward spring, but with the high figures now ruling it will be something unusual if the output is not increased. Be that as it may, it is pretty sure that for a brief period anyway the upward movement in prices has reached its limit. In times like these predictions are more than ordinarily dangerous, but there is really no apparent reason why there should be any further advance until actual consumption becomes considerably larger than it is at the present time. Meanwhile to-day's prices for Philadelphia and nearby deliveries are about as follows:

No. 1 X Foundry.....	\$17.25 to \$17.75
No. 2 X Foundry.....	16.50 to 17.00
No. 2 Plain.....	16.00 to 16.25
Standard Gray Forge.....	15.75 to 16.25
Ordinary Gray Forge.....	15.25 to 15.50
Basic.....	15.50 to 15.75
Low Phosphorus.....	19.75 to 20.00

Steel.—The feeling is very strong, and prices are firm at \$25 or over for nearby deliveries. Higher prices are confidently expected, but the mills are so full of orders that they are not taking much business at present prices.

Plates.—The situation shows continued improvement, although specifications are not given as promptly as the mills would like. Large consumers are getting a great many orders, however, so that there is little doubt that the mills will get specifications rapidly enough after the turn of the year. Prospects are of the most encouraging character, and it is believed that the next move will be an advance in prices, but in the meanwhile they remain as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, rectangular Plates, 24 inches wide and under.....	1.43½	1.48½
Tank, Bridge and Boat Steel, over 24 inches wide.....	1.53½	1.58½
Flange or Boiler Steel.....	1.63½	1.68½
Marine, A. B. M. A. and Commercial Fire Box Steel.....	1.73½	1.78½
Still Bottom Steel.....	1.83½	1.88½
Locomotive Fire Box Steel.....	2.03½	2.08½
The above are base prices for ¼-inch and heavier. The following extras apply: Per 100		
3-16 inch thick.....	\$0.10	pounds extra
Nos. 7 and 8 W. G.....	.15	"
No. 9 W. G.....	.25	"
Plates over 100 to 110 inches.....	.05	"
Plates over 110 to 115 inches.....	.10	"
Plates over 115 to 120 inches.....	.15	"
Plates over 120 to 125 inches.....	.25	"
Plates over 125 to 130 inches.....	.50	"
Plates over 130 inches.....	1.00	"
All sketches (excepting straight taper plates, varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).....	.10	"
Complete Circles.....	.20	"
All the above f.o.b. Philadelphia.		

Structural Material.—The mills are doing very well and next year is one of great promise to all the Structural mills. Bridge and ship builders and the railway interests are likely to have heavy requirements, so that there is a better feeling in this line than there has been for a long time past. Prices unchanged as follows: Beams, Channels and Angles, 1.53½c. to 1.65c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—The Bar trade is in a peculiar condition, most of the mills making their own prices without regard to the association price, which is 1.40c., base, Pittsburgh. Many of the mills quote 1.50c., f.o.b.; some a little more than that, while some might go a little less. The curious part of

it is that order books are well covered, yet there is plenty of demand, but it is the hardest kind of work to get specifications. In some cases mills flatly decline to quote on anything unless accompanied by specifications, either on the new business or on unfinished contracts; so that the tonnage actually accepted has not been as large as buyers would like. An advance on Steel Bars is expected, but in the meanwhile 1.43½c. to 1.50c. is quoted for Steel Bars, and 1.50c., f.o.b. mill, for Refined Iron.

Muck Bars.—Prices are again higher, with bids of \$28.25 to \$28.50, according to location of mill. Sellers quote \$29 and upward, f.o.b. their mills.

Old Material.—It is almost impossible to give exact quotations on Old Material. Holders have such exalted ideas that it would seem that no limit can be placed on what buyers ought to pay, and in a great many cases they make their claims good. A lot of 5000 tons Crop Ends was sold at a price that will cost \$16.75 to \$17, delivered, to let the buyer out. Heavy Melting Steel sold at \$16 to \$16.50, and 1000 tons of Bridge Scrap at \$20, Eastern Pennsylvania; another lot at \$20.50; No. 1 Yard Scrap sold at 118, Heavy Turnings at \$13.75, Iron Car Axles at over \$23 and Cast Borings at over \$10. Some sales, of course, have been made at lower prices, but it is claimed that if the lot is big enough, quality desirable and delivery reasonably good, the above sales could be duplicated without much difficulty. On the other hand, mills say they are not buying at the prices now asked. Bids and offers for deliveries in buyers' yards are about as follows:

No. 1 Steel Scrap.....	\$16.50 to \$17.00
Old Steel Axles.....	19.00 to 20.00
Old Iron Axles.....	23.00 to 23.50
Old Iron Rails.....	20.50 to 21.50
Old Car Wheels.....	14.50 to 15.00
Choice Scrap, R. R. No. 1 Wrought.....	19.00 to 19.50
No. 1 Yard Scrap.....	17.50 to 18.00
Machinery Scrap.....	15.00 to 15.50
Low Phosphorus Scrap.....	19.50 to 20.50
Wrought Iron Pipe.....	15.00 to 15.50
No. 1 Forge Fire Scrap.....	14.00 to 14.50
No. 2 Forge Fire Scrap, Ordinary.....	11.00 to 11.50
Wrought Turnings.....	12.50 to 13.00
Wrought Turnings, Choice Heavy.....	13.50 to 13.75
Cast Borings.....	9.75 to 10.25
Stove Plates.....	13.50 to 14.00

Cincinnati.

FIFTH AND MAIN STS., December 7, 1904.—(By Telegraph.)

Pig Iron.—The market during the past week, while possessing considerable strength, has manifested less activity than was in evidence several weeks since. This is probably attributable in a large degree at least to the fact that most consumers have covered for their immediate requirements, including the first quarter of next year, and a majority of the furnaces show little disposition to sell for a later period in the year. The general feeling prevails among agents that the close of the year will see still higher prices, and this prediction is probably responsible for the action taken by a number of the larger producers for withdrawing from the market. They seem to feel confident that better prices will be secured later in the month, and consequently are not worrying themselves about general conditions. Inquiries continue fairly good, most of them, however, reaching into the second quarter of 1905. Demand for Charcoal brands is exceptionally heavy as a result of the largely increased consumption incident to orders being placed by the railroad companies throughout the country for increased equipment. General foundry trade is reported as buying considerable tonnage, while the rolling mills and other similar industries are showing increased activity. Southern No. 2 has shown no advance since our last quotation and is obtainable at from \$13 to \$13.50, Birmingham basis. It is quite probable, however, that there is considerably less Iron on the market at \$13 than a week since, and it is generally conceded that \$13.50 more nearly represents the exact quotation. Northern Iron has advanced 50c. since last reported and is now quoted at from \$15.50 to \$16 at furnace. We have report of one sale of 400 tons of Southern Nos. 2 and 3 to a northern Ohio consumer on a \$13, Birmingham basis, and one sale of 500 tons Northern Iron for central Ohio delivery at \$15.50 at furnace. Perhaps the largest tonnage sold to any one concern during the week was 4000 tons of Malleable, which went to a firm in southern Ohio. Report is that the Sheffield Coal & Iron Company has blown in one of its furnaces during the past day or two. Freight rates from Hanging Rock district to Cincinnati, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$16.25 to \$16.75
Southern Coke, No. 2.....	15.75 to 16.25
Southern Coke, No. 3.....	15.25 to 15.75
Southern Coke, No. 4.....	14.75 to 15.25
Southern Coke, No. 1 Soft.....	16.25 to 16.75
Southern Coke, No. 2 Soft.....	15.75 to 16.25
Southern Coke, Gray Forge.....	14.50 to 15.00
Southern Coke, Mottled.....	14.25 to 14.75
Ohio Silvery, No. 1.....	18.15 to 18.65
Lake Superior Coke, No. 1.....	17.15 to 17.65
Lake Superior Coke, No. 2.....	16.65 to 17.15
Lake Superior Coke, No. 3.....	16.15 to 16.65

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....\$17.75 to \$18.25
Lake Superior Car Wheel and Malleable 17.00 to 17.50

Coke.—The market is very strong, the demand exceeding the supply. Operators are reported as not being able to get out the tonnage they anticipated in consequence of the continued drought, not to mention the fact that they have to contend with labor troubles as well as shortage in equipment. We quote the best brands of Connellsville Foundry from \$2.50 to \$2.65, f.o.b. ovens.

Plates and Bars.—The market has been strong and firm the past week. Orders are reported as coming in specifying for delivery far into the future. Prices remain unchanged, with the exception of Bars, which have slightly advanced. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.60c., with half extras; the same in smaller lots, 1.85c., with full extras; Steel Bars, in carload lots, 1.43c., with half extras; the same in smaller lots, 1.65c., with full extras; Base Angles, 1.53c., in carload lots; Beams and Channels, in carload lots, 1.53c.; Plates, $\frac{1}{4}$ -inch and heavier, 1.53c., in carload lots; in smaller lots, 1.80c.; Sheets, 16-gauge, in carload lots, 2.05c.; smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, $\frac{3}{4}$ x 3-16 and heavier, 1.63c., in carload lots.

Old Material.—The market is active and dealers report heavy sales during the week. There are no changes in prices as far as can be ascertained and a firm tone prevails. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$16 to \$17 per net ton; No. 1 Cast Scrap, \$13 to \$14 per net ton; Iron Rails, \$20 to \$21 per gross ton; Steel Rails, rolling lengths, \$14 to \$15 per gross ton; Relaying Rails, \$21 to \$22 per gross ton; Iron Axles, \$20 to \$21 per net ton; Car Wheels, \$14 to \$15 per gross ton; Heavy Melting Scrap, \$13 to \$14 per gross ton; Low Phosphorus Scrap, \$17 to \$18 per gross ton.

Pittsburgh.

PARK BUILDING, December 7, 1904.—(By Telegraph.)

Pig Iron.—While the Pig Iron market continues very strong in prices, there is a lull in the demand for Bessemer and Basic, and we do not hear of any large sales in the past week. Large consumers are pretty well covered, and in addition to this a good many large furnaces are being started, so that these consumers are able to supply their own needs. The minimum price of Bessemer and Basic is \$15.50 at Valley furnace, or \$16.35, Pittsburgh. Some sellers are holding their Iron for \$16 at furnace and report small sales at this price for prompt shipment. Forge Iron continues very scarce, the minimum of the market being \$15, Valley furnace, while sales for prompt shipment have been made at \$15.50. Buying of Foundry Iron continues fairly heavy, one large interest having bought a large tonnage in the past week. The minimum price of Northern No. 2 Foundry is \$16, Valley furnace, or \$16.85, Pittsburgh, and we note sales aggregating about 3000 tons at this price.

Steel.—We note a very heavy demand for Sheet and Tin Bars, due to the starting up of so many idle Sheet and Tin Plate plants. Consumers are offering a premium of 50c. a ton over official prices for prompt shipment of Sheet and Tin Bars and in some cases have been unable to get the Steel. There is no doubt that an advance will be made in prices of Billets and Sheet and Tin Bars at the meeting of the Billet Association on December 20. We quote Bessemer and Open Hearth Billets at \$21; Forging Billets, \$23; Long Sheet and Tin Bars, \$23, and Cut Bars, \$23.50, all f.o.b. Pittsburgh, to which freight to destination is added.

Railroad Spikes.—This week the three local concerns making Railroad Spikes advanced prices \$1 per ton, or 5c. per 100 lbs. We now quote \$1.65 per 100 lbs. in carloads and \$1.70 in less than carloads, f.o.b. Pittsburgh.

Iron and Steel Scrap.—The demand for Scrap continues heavy, but prices have reached such a high point that consumers are hesitating in making contracts. We quote: Heavy Melting Scrap, \$16; Cast Iron Borings, \$10; Wrought Iron Turnings, \$12.50; No. 1 Wrought Scrap, \$17.50 to \$18; Bundled Sheet Scrap, \$13.50; Rushing Scrap, \$13.50 to \$14; Old Steel Rails, 6 feet and over, \$16.50; Short Pieces, \$16; Steel Car Axles, \$18, and Iron Car Axles, \$24, all in gross tons.

(By Mail.)

Unofficial press reports printed in the past week to the effect that advances in prices had been made on Pipe, Wire and Wire Nails, and other products are untrue, and have caused no little confusion in the trade. No official advances have been made on any lines of product by the leading interests since our last report, but some of the independent

mills have made advances of \$1 to \$2 a ton on some lines of product, such as Sheets, Tin Plate and Wire Nails. It is true the whole market is very strong, but it is hardly likely there will be any official change in prices until the meetings of the Billet, Plate and Beam associations have been held, and which are scheduled for December 20. An advance of about \$2 a ton in Billets, Sheet and Tin Bars and \$4 a ton on Plates and Structural Steel is likely to be made at the meeting. Nothing could better indicate the active condition in the Iron trade at the present time than is shown by the action of the leading interests, notably the Carnegie Steel Company, which is starting up idle blast furnaces as fast as they can be put in operation, and by the American Sheet & Tin Plate Company, which has already started a number of idle Sheet and Tin Plate mills, and which expects to have all its plants in active operation by January 1. The Carnegie Steel Company has recently blown in three or four blast furnaces, and is getting the two stacks and Bessemer Steel works at Mingo Junction, Ohio, ready for operation. The Carnegie Company has recently started two Edgar Thomson furnaces, also the Thomas stack at Niles, Ohio, and the new No. 3 stack at South Sharon. It is probable the two Donora furnaces at Donora, which have never been operated, will be put in blast in a short time. Heavy demands are being made on the Carnegie Steel Company for Sheet and Tin Bars by the American Sheet and Tin Plate Company, and the Carnegie Company is operating all its various Steel plants to full capacity, and has very few Sheet or Tin Bars to spare for the outside market. As indicating the active demand for Sheet and Tin Bars we can state that some mills who roll these have recently turned away unsolicited orders offered them at an advance of 50c. a ton over regular prices.

Inquiries for Pig Iron are not quite as active as they have been, but a good deal of buying is being done, one large interest having bought very heavily of Foundry Iron, its purchases considerably exceeding 50,000 tons. Bessemer and Basic Iron are very firm at \$15.50 to \$16, at Valley furnace, for December and January shipment. The famine in supply of Forge Iron continues and sales for prompt delivery have been made as high as \$15.50, Valley furnace, or \$16.35, Pittsburgh. The Southern Pig Iron makers have again advanced prices and the minimum of No. 2 is \$13.50, Birmingham, with some sellers asking \$14. The situation in Northern Foundry Iron is very strong and No. 2 is firm at \$16, Valley, or \$16.85, Pittsburgh. Buying of Steel continues heavy, consumers desiring to cover as far ahead as possible, in view of the certain advance in prices to be made at the Billet meeting on December 20.

The tonnage in Finished Iron and Steel is heavy and the whole market is very firm. Some of the independent mills ask premiums of \$1 to \$2 a ton on Sheets, Wire and Cut Nails and other products, and are getting them. Jobbers seem willing to pay these premiums in order to accumulate stocks of goods on which higher prices seem certain.

Ferromanganese.—The market is fairly active and prices are higher. We quote foreign and domestic 80 per cent. Ferro at \$43 to \$44, delivered, for large lots.

Wire Rods.—A sharp advance has taken place in prices of Wire Rods, due to a very heavy demand which has suddenly come up and to the almost certain higher prices for Billets. In the last week Rods have advanced from \$2 to \$3 a ton, sellers now quoting \$31 to \$31.50 for both Bessemer and Open Hearth, with reports of sales at the latter price. Demand for Rods has not been as active for some months as it is at the present time, and it is predicted prices will be higher.

Skelp.—Some fairly heavy inquiries for Skelp are in the market and a good deal of tonnage has been sold since our last report. We note one sale of 2000 tons of Grooved Iron Skelp on the basis of 1.55c., Pittsburgh, and another of 2500 tons of Sheared at 1.65c. We quote: Grooved Iron Skelp, 1.55c. to 1.60c.; Sheared Iron Skelp, 1.60c. to 1.65c.; Grooved Steel Skelp, 1.40c. to 1.45c., and Sheared, 1.50c. to 1.55c. These prices are for ordinary widths and gauges, f.o.b. cars, maker's mill, terms 30 days, less 2 per cent. for cash in 10 days.

Muck Bar.—The famine in supply of Forge Iron and the very high prices that consumers are compelled to pay to get it have brought about a sharp advance in prices of Muck Bar, with the outlook that the market will be still higher. We quote best grades of Muck Bar, made from all Pig Iron, at \$28 to \$28.50, and are advised that some sellers are asking higher prices.

Steel Rails.—Official advices as to prices for next year are expected in a few days. Only very small lots are being placed and we quote at \$28 for Standard Sections. Demand for Light Rails is active and the market is higher. We quote Light Rails at \$21.50, which is absolute minimum for the heavier sections, and up to \$25 for the lighter sections. We understand that some mills are asking higher prices.

Structural Material.—The market is more active and the outlook better than for some time. Bids will be opened on December 8 for 5000 tons of Steel for rebuilding the

bridges of the Cincinnati, Hamilton & Dayton road. A small power house has been placed at New Orleans, calling for 600 to 700 tons, while the Majestic Theater at Chicago, calling for 3000 tons, and some bridge work for the Northern Pacific, amounting to 750 tons, has been placed with the McClintic-Marshall Construction Company of this city. The Beam Association is to meet in New York on December 20, when it is probable prices of Structural Steel will be advanced about \$4 a ton. We quote: Beams and Channels, up to 15-inch, 1.40c.; over 15-inch, 1.50c.; Angles, 3 x 2 x 1/4 inch thick up to 6 x 6 inches, 1.40c.; Angles, 8 x 8 and 7 x 3 1/2 inches, 1.50c.; Tees, 3-inch and larger, 1.40c.; Tees, 3-inch and larger, 1.45c. Under the Steel Bar Card, Angles, Channels and Tees under 3-inch are 1.40c., base, for Bessemer, and 1.45c., base, for Open Hearth, subject to half extras on the Standard Steel Bar Card.

Plates.—The demand for Plates continues quite active, consumers sending in liberal orders, in view of the expected advance in prices of at least \$4 a ton, to be made at the Plate meeting on December 20. The mills have taken an enormous tonnage of Plates and other small shapes, for the large number of Steel cars that have been ordered by the railroads and for the dozen or more Ore boats placed in the past month or two. As a result, the mills have more tonnage on their books than at any time for a year and the outlook is good. We quote Tank Plate, 1/4-inch thick, 6 1/4 to 24 inches wide, 1.30c., base; over 24 inches wide and up to 100 inches in width, 1.40c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Per 100 pounds extra.
Gauges lighter than 1/4-inch to and including 3-16-inch Plates on thin edges.....	\$0.10
Gauges No. 7 and No. 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 inches.....	.05
Plates over 110 to 115 inches.....	.10
Plates over 115 to 120 inches.....	.15
Plates over 120 to 125 inches.....	.25
Plates over 125 to 130 inches.....	.50
Plates over 130 inches.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
Marine, "A. B. M. A." and ordinary Fire Box Steel Plates.....	.20
Still Bottom Steel.....	.30
Locomotive Fire Box Steel.....	.50
Shell grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum, and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of 1/2 of 1 per cent. is allowable. Pacific Coast not included.

Sheets.—The very active condition existing in the Sheet trade is reflected in the fact that the American Sheet & Tin Plate Company will have all its Sheet mills in operation by January 1. Consumers are placing liberal orders in the expectation of an advance in prices. This has already been made by some of the independent mills, who quote \$1 to \$2 advance over official prices of the leading interest. Shipments of Sheets in December from the mills will be the heaviest in any one month for more than a year. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls at 1.95c.; No. 26, 2.05c.; No. 27, 2.10c., and No. 28, 2.20c. We quote Galvanized Sheets, as follows: Nos. 22 and 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.60 per square for 2 1/2-inch corrugation. Jobbers charge the usual advances over these prices for small lots from store.

Iron and Steel Bars.—The heavy advances made in prices of Iron Bars will probably have the effect of causing some consumers to go back to Steel Bars on account of the lower price. At the same time tonnage in Iron Bars is coming in very nicely, both in new orders and specifications on old contracts, and the mills are busy. The demand for Steel Bars is also heavy, consumers anticipating an advance in prices in view of the expected higher prices for Billets. We quote Refined Iron Bars at 1.50c., Youngstown, or 1.54 1/2c., Pittsburgh. Some concerns that use a good deal of Scrap in their Bars quote a slightly lower price. We quote Bessemer Steel Bars at 1.30c., base; Open Hearth Bars at 1.35c., base, for carload lots, with the usual advances for small lots.

Railroad Spikes.—Demand continues active, the mills entering more orders than for some months. We quote Railroad Spikes at \$1.60 in carloads, and \$1.65 in less than carloads, per 100 lbs., f.o.b. Pittsburgh.

Hoops and Bands.—The tonnage in Hoops and Bands is quite heavy, and we are advised that official prices on Steel Hoops, which for a time were more or less flexible, are now being rigidly held. We quote Steel Hoops at 1.55c. and Steel Bands at 1.30c. to 1.35c., extras as per Steel card. Some mills refuse to shade the higher price for Bands.

Tin Plate.—There is no let up in demand for Tin Plate, which is so active that some of the mills are able to

get 5c. to 10c. a box premium for prompt shipments. The leading interest is starting its Tin Plate plants as fast as Tin Bars can be secured, and will have its full capacity active by January 1. We quote 100-lb. Cokes at 3.40 net, f.o.b. Pittsburgh, terms 30 days, or 2 per cent. off for cash in ten days.

Merchant Pipe.—Reports of another advance of \$2 a ton in Pipe said to have been made last week are untrue. The demand continues very active, and the Pipe mills have all the tonnage on their books that they can turn out for the next two or three months. One or two independent mills are said to be out of the market as sellers for delivery before February next. Prices continue very firm, discounts to consumers in carloads being as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
1/2 and 3/4 inch.....	69	53	67	51
3/4 and 1 inch.....	73	61	71	59
1 to 3 inches.....	77	67	75 1/2	65 1/2
3 to 12 inches.....	72	57	70 1/2	55
Extra strong, plain ends,				
1/2 to 3/4 inch.....	62	50	60	48
3/4 to 1 inch.....	69	57	67	55
1 to 3 inches.....	65	53	63	51
Double extra strong,				
plain ends, 1/2 to 3/4 inch.....	58	47	56	45

Boiler Tubes.—The tonnage in Boiler Tubes is heavier than for some time and prices are being well maintained, only occasional slight concessions being made for desirable orders. Discounts to consumers in small lots are as follows:

	Boiler Tubes.	
	Steel.	Iron.
1 to 1 1/2 inches.....	46	43
1 1/2 to 2 1/2 inches.....	58	43
2 1/2 to 3 inches.....	60	48
3 to 5 inches.....	66	55
5 to 13 inches.....	58	43

Discounts on Boiler Tubes in carload lots are two points lower than the above.

Merchant Steel.—A good volume of tonnage is being entered by the mills, and specifications on contracts, some of which run up to July of next year, are coming in very liberally. Tonnage shipped by the leading interest in November was the heaviest in any one month in this year. Prices are very firm, but unchanged, and we quote: Tire Steel, 1.50c. to 1.55c.; Open Hearth Spring Steel, 1.90c. to 2c., depending on order; Sleigh Shoe, flat, 1.45c. to 1.50c.; Cutter Shoes, tapered and bent, 2c.; Smooth Finished Machinery Steel, 1.50c.; Toe Calk Steel, 1.85c. to 1.90c. Cold Rolled Shafting is unchanged in price, being 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Spelter.—While the demand for Spelter is quiet, prices are very firm and may be higher. We quote Prime Western Spelter for spot shipment at 5.63 1/2c. to 5.68 1/2c., Pittsburgh.

Coke.—The demand for both Furnace and Foundry Coke continues heavy and prices are higher than at any time for more than a year. New ovens are being fired in the Connellsville region almost daily, and work on new plants being built is being rushed as fast as possible. The active conditions in the Coke trade are causing a scarcity in labor, which is paid very high rates. The scant water supply is still interfering with output and no relief is yet in sight. We quote strictly Connellsville Furnace Coke at \$2.15 to \$2.35 and strictly Connellsville 72-hour Foundry Coke at \$2.25 to \$2.50 a ton at oven. Output is heavy, due to the starting up of so many ovens, and in the Upper and Lower Connellsville regions last week amounted to about 285,000 tons.

The Sharon Steel Hoop Company, Sharon, Pa., manufacturers of Open Hearth Billets, Sheet and Tin Bars and Hoops, Bands and Cotton Ties, has opened a branch office in Room 307, Farmers' Bank Building, Pittsburgh.

The American Sheet & Tin Plate Company, Frick Building, Pittsburgh, has established its own printing plant in that city and will be pleased to send literature relating to its products to any address upon application.

The Bessemer Pig Iron Association.—The annual meeting of the Bessemer Pig Iron Association was held in Cleveland, Ohio, December 3. It was unanimously decided to continue the association for another year from January 1 next. J. G. Butler, Jr., of Youngstown, Ohio, was re-elected president, and the Executive Committee was re-elected, as follows: Samuel Mather, L. C. Hanna, E. L. Ford, Frank Hitchcock, J. B. Stubbs, Robert Bentley and J. G. Butler, Jr. The association controls the output of a large number of blast furnaces in the Mahoning and Shenango valleys, and its operations for the year just closing have been very satisfactory to the members.

Birmingham.

BIRMINGHAM, ALA., December 5, 1904.

Since our last letter the Iron market has not only maintained the firmness that then characterized it, but it has gained in strength, and higher values have been obtained all along the line. As we are at that season of the year when activity in the market is as a rule dormant and remains so until the turn of the year, there was a large contingent of buyers who postponed action and withdrew from the market. For a short time the market was almost a dragging one. The necessities of some buyers forced them to enter the market, and they found that they could not only not depress prices, but that it was not an easy matter to satisfy their wants at current quotations. The majority of sellers had their order books well filled for the remainder of the year and were indifferent to orders at current values. Gradually the buyers began to accept the situation, and orders increased until the market became active with hardening prices, when the demand became general and ceased to be localized.

All this occurred when Northern Irons were quoted on a basis of 50c. less than Southern. They soon followed the pace set by the Southern interests, and this had its influence in still further stimulating prices. At this writing there have been sales of Iron on the basis of \$13.75 for No. 2 Foundry, one lot being 3500 tons to go to a Western point. There was a sale Saturday of 300 tons to go West, January delivery, basis of \$13.50 for No. 2 Foundry. There were sales of other lots of No. 2 Foundry and Soft for delivery the first quarter of the coming year on the same basis. Some Gray Forge sold at \$12 and some No. 3 Foundry went at \$13. One round lot went to a Pipe company, but the particulars are withheld. It is gossip, though, that it did not pay the highest prices of the week. Scattered among the sales are some that are quite pretentious, but the majority of them are medium amounts. In delivery they are scattered from December to next July, but the sales for the second quarter have been only moderate. Sellers have not been much inclined to go beyond the first quarter of the coming year in their deliveries. It is a singular fact that those who were averse to the advance and could see no good to be derived from it are now dreading a runaway market.

The effort to increase production drags its slow length along. In some cases stacks blown in have been compelled to bank, and full supplies are hard to keep up. Particularly is this the case with Coke. One large interest has been in the market for Coke for some time without being able to supply any part of its wants, and to one interest is due 1500 tons, delivery of which should have been made last August. So it is readily seen that it requires a good deal of hustling on the part of furnaces dependent in any degree upon the market for any of its supplies to keep in continuous operation.

As a matter of news to the trade it can be stated that Rogers, Brown & Co. have been appointed Southern selling agents for the Alabama Consolidated Coal & Iron Company.

The first freight train coming into Birmingham over the Seaboard Air Line is due to-day. This marks a new era in the history of this city, as it adds a new trunk line and opens up a new territory to our trade rich in agricultural and mineral products, and gives us another outlet to the sea. Other roads that have been in contemplation are assuming the shape of realities, and if plans mature this city will in a few years be the great railroad center of the South. Everything indicates activity in all businesses during the coming year. The Steel mill had a banner month in November, the output being nearly 22,000 tons of Steel Rails. The product is accepted as first class and the books are filled with orders.

The New York Machinery Market.

NEW YORK, December 7, 1904.

As the close of the year approaches it becomes apparent that the opening of the new year will be the signal for more active buying by the large corporations, many of whom are refraining from making purchases with the purpose of keeping expenditures for the year down to as low a level as possible; but when 1905 makes its entrance the managements will have the appropriations for the several departments in hand and will no doubt immediately begin to cover their requirements. There are several large projects which show evidence of maturing within the next few months, and which will result in the closing of contracts for large amounts of both machine tools and power plant equipment. The railroads are, of course, expected to be an important factor, but it has been pointed out that builders of both cars and locomotives are likely to come into the market as they have lately received many good orders.

What change there has been in the machine tool trade this last week is for the better, but merchants in other lines of mechanical equipment have not been so fortunate, their business being rather quiet. Particularly has this been the case with the makers of boilers, engines and

accessories. As has been noted in these columns, the improvement in the machine tool business has been partially due to the heavy purchases by the Japanese Government, which, with the influx of small orders, have made up a fair volume, and this in turn has been further increased by large purchases made by the Pennsylvania Railroad Company.

The most important event of the week was the extensive buying of machinery by the Pennsylvania Railroad Company, and the reliable reports of important developments of that road scheduled to occur shortly. While the company has for a considerable length of time been buying in small lots, not until lately has it bought in large quantities. It will be remembered that last summer the Pennsylvania issued specifications piecemeal which represented an aggregate of \$1,000,000 worth of machine tools, which were needed principally for equipping the many new shops then building and projected. Some of these requirements have now been covered; the large plant at South Bethlehem, Pa., has been practically provided for, and we understand that the equipment for the new machine shops at Olean, N. Y., has been secured within the last month. At this latter point the main machine shop is 192 x 194 feet. The purchases made this last week were principally for the new shops at Milham Junction, near Trenton, N. J., known as the Trenton shops, and which consist of an erecting and machine shop, 191 x 361 feet; blacksmith shop, 80 x 260 feet; wood working and paint shop, 81 x 182 feet, and other smaller buildings. As the orders were so widely distributed it is impossible to estimate the amount involved, but some idea may be gained from the fact that though it was only one of many recipients in New York, the Niles-Bement-Pond Company were awarded contracts for machine tools totaling about \$75,000 in value. Some of these machines, however, are for other shops along the line. Though the Pennsylvania Railroad Company has made such large purchases, it is likely to buy right along for some time to come. One of the improvements which is to be attended to before the close of the year is the mechanical equipment for the new terminal station at Washington, D. C. Among the buildings to be erected there are a power house, 77 x 238 feet, and a repair shop, 30 x 156 feet. The power plant will be equipped with about 3000 horse-power of engines and boilers, generators and a large quantity of appurtenances. The company now has the matter under consideration and has about decided upon the makes of the more important items. It is expected that the orders will be placed within the next week or two.

Some progress is being made by the Delaware, Lackawanna & Western Railroad Company with the plans for its proposed tunnel under the North River and the electrification of its lines from Hoboken as far out as Morristown, N. J. As soon as work on the grade crossings can be completed the installation of the electric system will be commenced. So far the grade crossings have all been finished except those through the Oranges, which cover about 3 miles of track. This portion will take a year or two to complete, so that the electric machinery will not be required for some time to come. It is estimated that the work through the Oranges alone will cost upward of \$3,500,000.

Among the new concerns which will be in the market early in the year for a quantity of new machinery is the recently incorporated Knox Motor Truck Company, Springfield, Mass., which will within the next week commence the erection of a new plant for the manufacture of motor cars. The first building to be constructed will be two stories high, 50 x 200 feet, and will be completed early in March. The company informs us that it will probably buy considerable new machinery, but has not yet completed the specifications and has not determined upon the machines that it will use. H. A. Knox is president, W. S. Pease, vice-president, and C. J. Wetsel, treasurer.

So far as ascertained A. P. Dienst & Co., Third avenue and 140th street, New York, will require pipe threading and cutting machines, machine shop equipment, gas engine and a belt power elevator for their new building. As regards the sizes of the various machines to be employed, the firm has not yet fully determined.

The improvements being made to the plant of the Coffin Valve Company, at Neponset, Mass., are being followed closely by the machinery trade which expects to receive some nice orders for equipment. The company is building a new machine shop with twice the capacity of the present one and intends to install during the coming year a large number of machine tools, such as planers, lathes and boring machines. The new plant will be electrically operated, and all of the new tools will be equipped with independent motors, as will also the old machines as fast as conditions will permit. The new building will be ready for occupancy by January 1, and the generator will be installed the latter part of this month.

Lathes, planer and drill press are required by J. T. Luce, Harrisburg, Pa. Mr. Luce, who was formerly manager of the rolling mill and tin plate works of the Lalanc & Grosjean Mfg. Company at Harrisburg, has leased the old iron foundry and machine shop of W. F. Bay & Bro.,

which he will operate under the name of the Harrisburg Iron Company.

The Lowell Model Company, Lowell, Mass., has been incorporated with a capital stock of \$25,000 to take over a business which has been manufacturing gasoline engines at Brookside, in Westford, Mass., for the past five years. The business will be removed to larger quarters in Lowell. The company is in the market for some new machine tools. The officers are: President, Lester G. Hall; treasurer, Clifford A. Moore, and clerk, John F. Spaulding, all of Lowell. Mr. Hall is the company's designer, having had long experience in gasoline engines.

The Philadelphia Iron Works, Philadelphia, which purchased property at Fort Washington, Pa., with the intention of erecting a boiler and tank plant on the site, has decided to remain in its present location, where it has secured sufficient adjoining property to allow it to extend its plant to meet its requirements.

While it is possibly premature to talk about a municipal electric light plant for New York, it will be of interest to note that plans are being laid to carry out such a project by the Board of Estimate, which went on record last week as being in favor of the scheme, and the Corporation Counsel has been directed to prepare an amendment to the charter carrying the necessary power, to be presented to the coming session of the Legislature. As all improvements of large proportions with which city authorities have to do must go through so much red tape, the proposed plant is yet a long ways off, if it ever reaches a tangible stage. However, the scheme is interesting in that if the power plant is built it will necessarily be of large capacity to furnish light for the streets and public buildings.

As is the case with other American machinery, manufacturers in England and on the Continent are awakening to the fact that pneumatic tools and appliances are a necessary adjunct to their business. The Chicago Pneumatic Tool Company, whose New York office is at 95 Liberty street, has just received an order for 705 tools through its London branch, the Consolidated Pneumatic Tool Company. Demonstrations being made in England of the electric drills the company is making corresponding in sizes to its Little Giant have proven very successful, and inasmuch as there is a large field for drills of this kind the company expects that in time its business in electric drills will exceed that of its pneumatic drills. The company reports that its business for November in number of orders far exceeds that of the corresponding month of last year, also the previous month this year, and indications are that December will be equally as good, if not better.

Whitcomb Mfg. Company, Worcester, Mass., announces that the Vandyck-Churchill Company, 8 Dey street, New York, has been appointed general agent for the sale of Whitcomb planers.

The A. D. Granger Company has moved its Philadelphia office to the Commonwealth Trust Building, Chestnut and Twelfth streets, where much larger and more commodious offices have been fitted up. T. M. Simpson remains as manager of the office, his territory covering the eastern portion of Pennsylvania, from Harrisburg to Philadelphia, and the southern half of New Jersey.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until December 20 for a quantity of supplies for the Norfolk and Charleston navy yards, including punches, steam boilers, &c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until December 20 for a quantity of supplies for the Pensacola, Key West and New Orleans navy yards, including pile driving hammer, foundry furnaces, bilge pumps, feed pump, duplex steam pumps, centrifugal pump, hoisting engines, concrete mixer, &c.

Proposals will be received at the Mayor's office, Jefferson, Texas, until December 15 for the construction of a water system for the city. A combined gasoline engine and pump with a capacity of 15,000 gallons per hour, 40,000-gallon steel tank and tower, cast iron mains, 14 hydrants, brick pump house and intake are required.

The Water Committee of Marion, N. C., will receive bids until December 17 for the construction of a system of water works, consisting of a steam plant, pumps, reservoir, 4 miles of pipe and appurtenances.

The following bids were opened November 30 by the Isthmian Canal Commission, Washington, for earth spreaders and unloading machines for use on the Isthmus of Panama:

Earth Spreaders.

O. B. Jordan, Harvey, Ill., three spreaders, \$6000 each, delivered at Harvey, Ill., in 80 days; on tracks at Colon in six months. If delivery can be made f.o.b. Illinois the price will be for spreader of 100,000 pounds capacity \$3883 and for 60,000 pounds capacity \$3700.

Mann-McCann Company, Chicago, Ill., \$3500 each, packed for export delivery at New York City.

Unloading Machines.

Item 1, 60-ton uploader; 2, two 25-ton uploaders; 3, two extra flexible steam connections; 4, one extra 1½-inch wire cable; 5, one extra 1¼-inch wire cable; 6, two right hand unloader plows for car 9 feet wide; 7, one right hand unloader plow for car 8 feet 9 inches wide.

Lidgerwood Mfg. Company New York, item 1, \$5364; 2, 7928; 3, \$120; 4, \$444 wire cable and \$252 crucible steel wire cable; 5, \$354 wire cable and \$208 crucible steel wire cable, New York delivery.

Marion Steam Shovel Company, Marion, Ohio, item 6, \$1470; 7, \$735, f.o.b. Marion without boxing.

The Isthmian Canal Commission opened the following bids November 25 for furnishing diaphragm trench pumps:

Class 1, two pumps and diaphragms; 2, 14,500 feet lead pipe.

J. L. Mott Iron Works, Washington, D. C., item 1, New York delivery, \$335.80; Colon delivery, \$344.25; item 2, New York delivery, \$1819.17; Colon delivery, \$1949.80.

Hoffman Engineering & Contracting Company, Philadelphia, Pa., item 1, New York, \$425; Colon, \$450; 2, New York, \$2400; Colon, \$2600.

Edson Mfg. Company, Boston, Mass., item 1, New York, \$369.90.

James B. Clow & Sons, Chicago, Ill., item 1, New York, \$378.65; Colon, \$394.90.

Harrall L. Bond Company, Boston, Mass., item 1, New York, \$288; Colon, \$300.

William Wirt Clark & Sons, Baltimore, Md., item 1, New York, \$304.02; 2, New York, \$837.36.

National Lead Company, New York, item 2, New York, \$1957.50.

Fox Bros. & Co., New York, item 1, New York \$237.09; 2, New York, \$2131.

J. B. Kendall, Washington, D. C., item 1, New York, \$345.

National Supply Company, Toledo, Ohio, item 1, New York, \$157.75; 2, New York, \$623.50.

H. Channon Company, Chicago, Ill., item 1, New York, \$342.

Goulds Mfg. Company, Seneca Falls, N. Y., item 1, New York, \$303.75.

Selby Smelting & Lead Company, San Francisco, Cal., item 2, Ancon delivery, \$2453.40.

Boston & Lockport Block Company, Boston, item 1, New York, \$276.30.

Catalogues Wanted.—The Phillips & Wilder Mfg. Company, 110 Cherokee street, South St. Joseph, Mo., is in the market for all kinds of machine shop goods, and is desirous of receiving catalogues from manufacturers of machinery, &c.

The Future of the Rand.—In a recent letter to the *London Economist* the special commissioner of that journal refers as follows to the Rand of the future: "With an ample supply of labor, the industry can be made to expand at a very high pressure. The bigger out-crop mines, and nearly all the deep levels, talk of adding materially to their plants, to say nothing of all the big new mines that are approaching the stage of production. All those who control these mines now know that their future is going to be on an average low grade basis—for 33 shillings a ton is just eight pennyweights—but they also have excellent evidence for believing that on this basis their ore contents are going to be bigger than they were once estimated to be. I believe we are within measurable distance of seeing 15,000 stamps at work on the Witwatersrand. These will crush 25,000,000 tons a year, and the yield of gold, at 33 shillings a ton, would be £41,250,000! I don't say that this immense return can be kept up for any length of time, but I fail to see why we should not look to that figure as likely to mark the zenith of a great industry."

The Keystone Nail Company, Philadelphia, Pa., is a new concern recently formed by Herbert J. Maloney and Josiah D. Seidell for the purpose of galvanizing nails, screws, rivets, washers and small work of all descriptions. It has located at Sixteenth street and Washington avenue, and has equipped its plant with the Porter patent galvanizing machines, for which it is also the agent. The new company will carry a complete stock of galvanized nails of all descriptions, as well as the regular cut and wire nails, it being the local agent for cut nails made by the E. & G. Brooke Iron Company.

Cleveland.

CLEVELAND, OHIO, December 6, 1904.

Iron Ore.—Some of the boats carrying Ore are still running, though the lake insurance season ended December 5. These boats are owned by the Steel Corporation, and one or two of the big companies which insure their own boats. The movement for this time of the year is extraordinarily heavy. Some of the consumers are beginning to fear a shortage on the docks next spring, especially if the opening of the season of navigation is delayed to any extent. The movement from the lake docks to the furnace stock piles is getting to be heavier than it was. The car situation is rather serious. It is reported that some consumers have been trying to buy Ore being under the belief that some Ore, which had been brought down in anticipation of such a need, remained unsold. As far as learned, no Ore has been sold on any such ground.

Pig Iron.—The Pig Iron situation, especially as to Foundry, is getting stronger, without very much being done. The number of furnaces getting sold up for the remainder of December and through the first quarter of next year are on the increase, and both spot and contract Iron in those quarters are getting very scarce. This situation strengthens the market even without any sales at higher prices. Reports are that shipments have been very heavy. Most of the furnaces have been shipping in excess of their outputs, thereby cutting down their stocks to a considerable extent. Foundry Iron here has been quoted at \$16 in the Valleys for No. 2 Foundry, with some few who have Iron for spot delivery asking \$16.50. There has been good inquiry for Bessemer Iron from the smaller consumers. The association has had no sales and no orders are impending. Prices rule about \$15.50 to \$16 in the Valleys. This high price is due to a certain extent to the short supply, many of the Bessemer furnaces not being able to go into blast on account of a lack of Coke. Most of the furnaces which are now idle are either Bessemer or Basic producers. Coke prices are again stronger. The dry weather in the Coke region has had a big influence on the trade and production has been limited. Ruling quotations now are \$2.75 for 72-hour Foundry Coke and \$2.50 for good Furnace Coke. There is also difficulty in getting enough cars.

Finished Iron and Steel.—The dominating interest in the Steel market this week has been in the Bar Iron and Steel situation. Bar Iron prices have advanced to 1.60c., at the mill, Youngstown, while an option given several weeks ago at 1.55c. has been exercised by the buyer. There is a good demand, but all concerned unite in the statement that it is not so much the demand as the prices for Scrap that causes the advance. There is a noticeable change from Iron to Bessemer Steel Bars in the ordering. The mills are going rather slowly in making sales of Steel Bars, an advance in the price being expected at almost any time. The buying has become heavy enough now to warrant it. This week some of the Agricultural Implement buyers have been in the market to piece out their requirements. They have also been buying in anticipation of an advance in price. The quotation still is 1.30c., Pittsburgh, for Bessemer Steel and 1.35c., Pittsburgh for Open Hearth. There has been an unusually good demand for Billets. Most of the buying in this territory has been of the forging qualities. The full list of extras is being charged, and the mills are also getting a premium, in many instances as high as \$2 or more a ton. This brings the price of the forging Billets up to about \$27.50, Cleveland. There is good business also in Sheets. The buying is not extraordinary, but is good for this time of the year. The base price of 2.40c. for Nos. 22 to 24 out of stock still holds, while the same gauge one-pass cold rolled in car lots at the mill is selling at 2.10c. In Plates there is a good steady business from some of the car companies, while shipments on specification to the shipbuilding concerns are heavy. There is some buying by Boiler concerns. The specifications against contracts in Shapes are heavy. Most of the smaller mills are not now taking contracts very freely for future delivery, being in hopes of getting better prices. Rails are unchanged, the deliveries being heavy, but new orders from this territory being slim.

Old Material.—The dealers in Scrap are playing pretty close at present. The dealers are able to get hold of only enough Material for the immediate needs of their customers. Those who have it are holding for the better prices, which they hope to get later on. We continue to quote, all gross tons: Old Steel Rails, \$14 to \$14.50 and higher; Old Car Wheels, \$14; Heavy Melting Steel, \$14. All net tons: Cast Borings, \$7; No. 1 Busheling, \$13 to \$13.50; No. 1 Railroad Wrought, \$15; Iron Car Axles (nominal—some sizes higher), \$18 to \$19; No. 1 Cast, \$14.50; Stove Plate, \$10; Wrought Iron and Steel Turnings and Drillings, \$12.

On Saturday evening, December 3, a banquet was given in the offices of the Pittsburgh Steel Company, at Monessen, Pa., marking the second anniversary of the

starting of the large plant of this concern. About 150 guests were present, including many officials from the main offices at Pittsburgh. George Nash, manager of the plant, acted as toastmaster, and addresses were made by Wallace H. Rowe, president; William C. Reitz, treasurer, and others. The operations of the large rod, wire, wire nail and fencing departments of this plant have been extremely successful, and at the present time every department of the works is in operation to its full capacity.

New York.

NEW YORK, December 7, 1904.

Pig Iron.—There has been a good deal of activity, notably in Basic Pig Iron. Sales during the week aggregate fully 65,000 tons in round lots, including 16,500 for one interest, two 10,000 blocks for eastern Pennsylvania and two 6000-ton lots for New England Steel plants. Practically all of this Iron was sold on the basis of \$15 at furnace. There have been large sales to Eastern Cast Iron Pipe foundries, two of whom have taken about 35,000 tons. There have been sales also of some round lots for general foundry purposes, one electrical company taking a lot of 4000 tons. Prices are very firm and may be quoted at tide-water, for Northern Iron, \$17.25 to \$17.50 for No. 1 X Foundry, \$16.75 to \$17.25 for No. 2 X Foundry, \$16.25 to \$16.75 for No. 2 Plain, and \$15.50 to \$15.75 for Mill Iron. Southern Irons are quoted: \$17.25 to \$17.50 for No. 1 Foundry, \$16.75 to 17.25 for No. 2 Foundry, and \$16.25 to \$16.50 for No. 3 Foundry.

Steel Rails.—Some of the mills have booked considerable tonnage for 1905 delivery, and it is expected that when the official announcement of the new prices is made next week a large amount of orders will be placed.

Cast Iron Pipe.—Manufacturers are so well sold up that they are becoming quite independent. It is no longer necessary to cut prices to get orders. An Eastern foundry, bidding a good price, secured the contract for 1800 net tons placed by Providence, R. I., on December 1. General business continues active, inquiries being rapidly followed by purchases. Carload lots are quoted at \$26.50 per net ton for 6 to 10 inch, at tidewater.

Finished Iron and Steel.—Quite a number of railroad companies are in the market for bridge work, but little actual business has been placed since last report. The Boston Elevated contract has not yet been awarded. Track elevation projects are coming up in various parts of the country, and it is expected that a great deal of tonnage will be required on this account during the coming year. The leading interest has secured an order for the erection of a warehouse in Cincinnati requiring 3500 tons. Another contract pending is for the construction of a warehouse in Chicago, which will also take about 3500 tons. The general demand for Structural Shapes is excellent. The Plate trade in this vicinity has been rather quiet during the week. It is probable that the approach of the inventory season deters buyers from adding to their stock at present. Nevertheless, it is quite possible that as the time for the meeting of the Plate Association draws near, with its very strong expectation of an advance in prices, another spurt in buying may be seen. The Bar Iron market is very strong, the mills asking a premium over the agreed 1.40c., Pittsburgh basis. Quotations, at tidewater, are as follows: Beams, Channels, Angles and Zees, 1.54½c. to 1.80c.; Tees, 1.59½c. to 1.80c.; Bulb Angles and Deck Beams, 1.64½c. to 1.85c.; Sheared Plates, in carload lots, 1.54½c. to 1.65c. for Tank, 1.64½c. to 1.80c. for Flange, 1.74½c. to 1.90c. for Marine, and 1.74½c. to 2.50c. for Fire Box, according to specifications; Refined Bar Iron, 1.59½c. to 1.64½c.; Soft Steel Bars, 1.44½c. to 1.50c.

Old Material.—Transactions have been quite numerous, the demand being particularly heavy for Wrought Scrap and Re-rolling Rails. Local railroad companies have made several sales of Re-rolling Rails of 400 to 500 tons each. A sale of 500 tons of Car Wheels at top prices is also noted. Old Iron Rails have advanced, this class of Material now being very scarce; in fact, consumers desiring Old Iron Rails may find it difficult to purchase them at the prices we quote, which represent past transactions. Prices, per gross ton, in New York and vicinity are approximately as follows:

Old Iron Rails.....	\$19.00 to \$20.00
Old Steel Rails, re-rolling lengths.....	15.00 to 16.00
Old Steel Rails, short pieces.....	14.00 to 15.00
Relaying Rails.....	19.00 to 20.00
Old Car Wheels.....	15.00 to 16.00
Old Iron Car Axles.....	21.00 to 22.00
Old Steel Car Axles.....	17.00 to 18.00
Heavy Steel Scrap.....	14.00 to 15.00
No. 1 Railroad Wrought Scrap.....	17.00 to 17.50
Yard Wrought Scrap.....	14.50 to 15.50
Iron Track Scrap.....	15.00 to 16.00
Wrought Pipe.....	12.00 to 12.50
Ordinary Light Iron.....	10.00 to 11.00

Cast Borings.....	7.00 to	7.50
Wrought Turnings.....	9.75 to	10.00
No. 1 Machinery Cast.....	14.00 to	14.50
Stove Plate.....	11.00 to	11.50

Metal Market.

NEW YORK, December 7, 1904.

Pig Tin.—Following the issue of the monthly statistics last week the Tin market developed weakness and has since declined from day to day. The statistical figures are regarded as very unfavorable, as they indicate heavy increases in shipments from the East and Australia, with deliveries, especially in Europe, showing a falling off as compared with last year. The arrival of the Minnehaha this week with 600 tons of Tin removed the temporary local shortage of spot metal and caused further weakness in the market here. The market closed at the lowest, with spot quoted at 29.12½c. to 29.27½c.; December at 29c. to 29.25c., and January at 28.87½c. to 29.12½c. The London market has declined sharply and to-day was quoted at £133 for spot and £131 12s. 6d. for futures. Local business has been very limited, buyers being conservative in purchasing at the present comparatively high prices. The arrivals so far this month have amounted to 655 tons, while 1845 tons are afloat. The monthly statistics, as compiled by the New York Metal Exchange, are as follows:

Deliveries into consumption were good, amounting to 2800 tons. The total for the 11 months of this year shows a decrease of 3200 tons compared with the same period of last year.

The combined deliveries of London and Holland for November were 446 tons smaller than last year. For the 11 months of this year they show an increase of 545 tons compared with the same period of last year.

Shipments from the Straits for November were 1850 tons larger than for the same month of last year. For the 11 months of this year they are 3851 tons more than for the same period of last year.

Australia shipped 360 tons more than in November of last year. The total increase for the 11 months of this year amounts to 148 tons compared with the same period of last year.

The total visible supply on November 30 is 783 tons below that of November 30 of last year.

Arrivals at the Atlantic ports amounted to.....	Tons.
Total arrivals since January 1, 1904.....	2,204
Of which from Straits by direct steamers.....	32,574
Of which from United Kingdom.....	11,175
Of which from Holland.....	19,596
Of which from European Continent.....	537
The deliveries for November we figure as.....	1,266
Total deliveries since January, 1904.....	2,800
Deliveries same period in 1903.....	32,700
The shipments from Straits amounted to.....	35,900
Against previous month.....	5,400
Against November, 1903.....	5,017
Australia shipped.....	3,550
Against previous month.....	675
Against November, 1903.....	350
Statistics for the United States—Pacific ports excluded—	315
November 30, show as follows:	
Stocks, including on dock and arrivals.....	1,244
Afloat.....	2,495
Total.....	3,739

Below we give the total statistics for Europe and the United States, showing:

Total visible supply November 30, 1904.....	Tons.
Against visible supply October 30, 1904.....	14,412
Against visible supply November 30, 1903.....	12,194
Against visible supply December 31, 1903.....	15,195
Against visible supply December 31, 1903.....	14,274

Copper.—The market has been quiet, with a light business passing, so far as domestic buying is concerned. Deliveries now being made, both to home and foreign buyers, are generally on contracts placed some time since, when prices were materially below the figures now quoted. It is understood that a heavy volume of orders was placed by the Brass manufacturers and the electrical equipment makers, the amount of which was sufficiently large to impel sellers to limit their foreign contracts in some cases in order to meet the requirements of the home trade. The question that is now agitating the trade is as to whether the European consumers will continue to buy Copper in this market at the higher figures now ruling. The future course of the market, it is claimed, will depend mainly upon the attitude of the European buyers in this regard. Some in the trade are of the opinion that Europe will not take hold at the present high level of prices. The market this week has developed some weakness, although prices are nominally unchanged. Lake is still quoted at 14.87½c. to 15.12½c., Electrolytic at 14.75c. to 15c., and Casting Copper at 14.50c. to 14.75c. The London market has declined £1 3s. 9d. since the date of our last report, closing to-day at £86 for spot and £86 7s. 6d. for futures. Best Selected is quoted at £70. The exports of Copper since December 1 have amounted to 3064 tons. The Copper statistics for the month of November, as compiled by C. Mayer, secretary of the New York Metal Exchange, are as follows:

The market during the month of November was firm and prices considerably higher. The average prices for the month were as follows: Lake, 14.52c.; electrolytic, 14.42½c.; casting, 14.12½c. London opened at £82 12s. 6d. for spot standard contracts; highest £87 3s. 9d., lowest £82 7s. 6d., closing at £87 3s. 9d.

Exports were large; the total for the eleven months shows an increase of 105,104 tons, compared with the same period of

last year. The exports of domestic Copper from Atlantic ports for the month of November as per Custom House returns were as follows: From New York, 14,172 tons Copper, 20 tons Matte; from Baltimore, 7845 tons Copper; from Philadelphia, 60 tons Copper. Totals, 22,077 tons Copper, 20 tons Matte.

Reducing the Matte at 55 per cent. into fine Copper, the total exportation for November amounts to 22,088 tons of 2,240 pounds.

Total exports since January 1, 1904, exclusive of Southern ports for November, 227,682 tons, against same period in 1903, 123,578 tons.

Pig Lead.—Demand for Lead is moderate, but spot supplies and offerings from the West being still light serve to keep prices firm at last week's figures. Spot Lead in New York is quoted at 4.60c. to 4.70c. The St. Louis market has advanced ¼c. and was quoted to-day at 4.52½c. to 4.62½c., according to brand. The London market was quoted at £12 17s. 6d. The American Smelting & Refining Company has changed its quotation to the basis of 4.60c. for "shipment" Desilverized in 50-ton lots, being an advance of 40c. over its previous quotation and bringing its figures up to the actual current market rate.

Spelter.—Is quiet, but strong, on account of the continued scarcity of spot metal. Spot Spelter was quoted to-day at 5.75c. to 5.87½c. The St. Louis market has stiffened again and is quoted at 5.70c. London cables show a slight advance, quoting £25.

Antimony.—The demand for Antimony has fallen off to some extent, and the market is lower and easy. Cookson's was quoted to-day at 9.25c. to 9.75c.; Hallett's at 9c. to 9.50c., and other grades at 8c. to 8.50c.

Nickel.—About the usual amount of business is noted. Prices are quoted for large lots at 40c. to 45c., with smaller quantities ruling at 50c. to 60c.

Quicksilver.—The market remains firm and unchanged, flasks of 75 lbs. being quoted at \$40. The London price is unchanged at £7 15s.

Tin Plate.—Both the leading producer and the independent mills are firm in their prices, and the market is strong, with a fair amount of new business being placed. Prompt shipments are reported to be somewhat difficult to secure from the mills, and some of the makers are obtaining premiums of 5c. to 10c. per box on spot Plates. The American Sheet & Tin Plate Company quotes \$3.64 per box, f.o.b. New York, for 14 x 20 100-lb. Coke Plates, or \$3.45, f.o.b. Pittsburgh. The Welsh market has gone off 1½ pence, to 12 shillings 4½ pence, f.o.b. Swansea.

Contract for Large Beam Mill.—Mackintosh, Hemphill & Co., Pittsburgh, have received a contract from the Eastern Steel Company, Pottsville, Pa., for a 28-inch beam mill, to have four stands of three-high rolls. The housings for this mill will be of steel castings. The mill will be driven by a 48 and 72 x 60 inch direct connected cross compound reversing engine. This engine will be equipped with variable cut off operated by an electric motor under control of the engineer, this device being patented by Mackintosh, Hemphill & Co. This is a direct departure in beam mill practice and greater economy will be obtained, as a compound engine is used, thus reducing the steam consumption per ton of beams rolled and which is expected to be much less than in any other similar mill. The same firm also have a contract for a hydraulic shear with intensifier for cutting up to 24-inch beam blanks, together with the necessary tables, and also a scrap conveyor. They further have a contract for one hot saw and one cold saw for this mill for cutting up to 24-inch beams. These saws will be driven by electric motors mounted on them, which is also an innovation in beam mill practice. They also have a contract to rebuild the old 32-inch beam mill of the Eastern Steel Company and will equip it with new tables and manipulators.

Since the arrest of Joseph Valentine, president of the Iron Molders' Union, and his alleged accomplices, there has been no trouble or disturbance of any description at the Cincinnati foundries. It is reported that the strikers have removed all pickets from around the struck foundries, and a condition of extreme quiet prevails. The case of the alleged conspirators will probably reach the Grand Jury some time this week.

The United States Steel Corporation has placed orders for 1600 steel cars and for 30 locomotives.

The annual convention of the Master Car Builders' and Master Mechanics' associations will be held in June at Manhattan Beach, Long Island, N. Y.

The Duty on Iron Molders' Patterns.

A final hearing on the controversy between R. Hoe & Co. on the one side and the Government and the Pattern Makers' Union on the other as to the duty to be levied on iron molders' patterns imported from England was held before the Board of United States General Appraisers on December 1. The Government was represented by B. A. Levett, assisted by W. Wickham Smith, who had been retained by the Pattern Makers' Union, and the importers by Albert Comstock. The testimony of several of the labor union witnesses was heard and the Board took the case under advisement. The importers claim that the patterns should be admitted free of duty under the following paragraph of the free list:

Models of inventions and of other improvements in the arts, including patterns for machinery, but no article shall be deemed a model or pattern which can be fitted for use otherwise.

The Government's claim is that they are dutiable at 35 per cent. as nonenumerated manufactures of wood, and its case is set forth in a brief filed with the Board on December 5 by Mr. Levett, from which the following extracts are taken:

It is admitted on the record by the importers that the articles are molders' patterns, and there is no dispute as to what a molders' pattern is. It is a pattern made of wood, which is used to form a mold in sand, in which the metal is cast to produce parts of machines.

It may be conceded that the articles are patterns for machinery, but the Government's contention is that there are two classes of patterns for machinery—namely, first, molders' patterns such as those here in question; and, second, what are known as model patterns, which are the patterns for machinery intended to be permitted free entry by paragraph 616. A model pattern, as defined by the testimony, is a pattern for machinery, which embodies the conception of the machine, and which has no use except for that purpose, being of the same category as a model of an invention.

The words "which can be fitted for use otherwise" are obscure, for in order to find what the "use otherwise" can be, it is first necessary to ascertain what is the use of patterns for machinery, which is the meat of the question here involved. Counsel for the importers was at great pains during the hearing to show that molders' patterns cannot be used for any other purpose than for making castings. There is no dispute about this; it is quite clear that if molders' patterns are the "patterns for machinery" provided for in paragraph 616, they cannot be fitted for use otherwise than as such patterns for machinery. In other words, counsel's strenuous efforts were directed to proving the self evident fact that the only use of molders' patterns is the use of molders' patterns. This is merely begging the question. It is necessary, therefore, to scrutinize the paragraph more carefully to find what that use is, and it is submitted that that use is clearly shown by the first part of the paragraph, taken in conjunction with the word "including." There is abundant authority to show that the word "including" as here used indicates that the articles included must be *ejusdem generis* with the articles enumerated before the word. It is well known that models of inventions and all other improvements in the arts are designed and intended to embody the conception of the inventor, and for no other purpose. As to these words, the meaning of the phrase "which can be fitted for use otherwise" is clear; that is, if a model or an improvement can be fitted for use other than to embody or demonstrate the conception of the inventor it is taken out of the paragraph. And, just so, if patterns for machinery (being included in the exemption of models of inventions and of other improvements in the arts) can be shown to have a use other than to embody or demonstrate the conception of the inventor or designer, they are exempted from the paragraph. It is easy to see why patterns for machinery of this class were separately mentioned as being included in the class of models of inventions and of other improvements in the arts. Without their inclusion it could be contended with force that model patterns, or patterns which were designed to demonstrate the form and use of parts of machinery, were not included in the phrase "models of inventions and of other improvements in the arts," because they might not embody conceptions of inventions and improvements. Congress intended to permit model patterns to come in free, and used the words "patterns for machinery," which aptly described them, but used the word "including" to show that they were to be of the same general nature of models of inventions.

The language of paragraph 616 is so drawn that even a model of an invention is denied free entry if it can be put to other use than as a model, and it is not easy to conceive that Congress would be so strict as to a model of an invention and yet permit free entry of a class of articles which constitute a large commercial class entering into direct competition with the product of the laboring class of this country. It is submitted that full scope is given to the paragraph by limiting patterns for machinery to such as are model patterns, and that this is the intention of Congress is unquestionably shown by the use of the word "including," which indicates in the strongest possible way that the patterns entitled to free entry must

be of the same category as models of inventions and of other improvements in the arts.

The case is being watched with a great deal of attention by manufacturers of machinery all over the country, as it is admitted by them that if the case is decided in favor of the importers it will place a powerful weapon in their hands in the case of labor troubles among the pattern makers in this country. The importation of patterns from England by R. Hoe & Co. was begun shortly after a strike of the pattern makers in their factory here.

Pacific Coast Trade Prospects.

SAN FRANCISCO, CAL., November 26, 1904.—Up to date the weather could not be more favorable for the coming cereal crops than it has been. Now, however, as usual, some anxiety is beginning to be felt on account of rain holding off, but in a general way it may be said that up to this time the State, excepting the south, has had all the rain needed. The fear of drought, however, has had no effect on trade, which continues active. Though there has been some falling off in the number and value of contracts for building during the past four weeks, still the total for the year will be a very high one, now estimated at close to \$20,000,000 in value, and of these contracts at least \$3,000,000 worth still remains to be completed, so this will carry the business of supplying material for them far into the new year, and, whatever the character of 1905 may be, its opening months will be active in the building trade and in building and other hardware. There is, however, no fear of the new year, as most of the lines of trade which contribute to the support of this department will be active.

The business done by our foundrymen and machinists during the year was quite as good as that of 1903. We have not to hand imports by rail for the year, but they exceeded those for the previous year. As to pig iron, the principal feature in imports of raw materials, the total of 1904 will fall short of that for 1903. The following are the figures up to date taken from the Custom House books:

	Gross tons.	Value.
January	2,150	\$30,543
February	2,313	31,097
March	5,604	76,771
April	980	16,221
May	950	15,475
June	400	4,822
July	1,106	12,321
August	1,550	18,799
September	1,884	22,515
October	450	5,960
Totals.....	17,387	\$234,033

Of the total here given the greater part is of English and Scotch origin, but there are included considerable imports from Belgium and other countries, not forgetting Sweden, which has been a recent accession to our sources of supply. In addition to the totals given above there must be added the Eastern iron, a rather small quantity on account of the cost of transportation, and the use of a very large amount of scrap iron, which always forms a considerable part of the raw material passing through a foundry.

We received 1743 gross tons of foreign bar iron in the ten months, of which the larger proportion was imported from the Continent of Europe—that is to say, from Belgium, Germany, &c.—as in the case of pig iron. A good quantity came from Sweden; indeed, all the imports in July, 527 tons, were from that country. In addition to the regular merchant bar we had 4676 tons of rails, valued at \$99,700. The importations of tin plate by sea as compared with other years have been very light, especially when contrasted with the old days when they reached annually into hundreds of thousands of dollars. American tin plate now takes the place of the foreign article. The receipts of foreign tin plate during the ten months were 2035 gross tons. It is only where there is a drawback in exports that foreign tin plate can be used, and it will depend on the extension of our foreign trade in these articles as to whether we shall ever become a large customer again for England's tin plate.

The Aztec cleared yesterday for Japanese ports with a cargo valued at over \$1,000,000, including machinery valued at close to \$500,000, the largest machinery shipment ever made from this port.

J. O. L.

PERSONAL.

Joseph Hartley has resigned the superintendency of the Genesee Iron Company's plant at Charlotte, N. Y., to accept a similar position at the Londonderry Iron & Mining Company's plant, Londonderry, Nova Scotia. Mr. Hartley was formerly employed by the Londonderry Company.

J. H. Ferguson has tendered his resignation as superintendent of the Tennessee Coal, Iron & Railroad Company's plant at Tracy City, Tenn., in order to accept the position of general superintendent of the property of the Lookout Mountain Iron Company at Battelle, Ala., which includes coal and ore mines and a blast furnace.

William Barclay Parsons has tendered his resignation as chief engineer of the Rapid Transit Commission of New York City, which position he has held since the beginning of the construction of the New York City Subway. Mr. Parsons' resignation is due to the pressure of other business and has been tendered only on the completion of the great work which he has carried to a successful issue. It is expected that he will consent to be retained as consulting engineer of the commission.

S. W. Croxton of Cleveland, president of the Penn Iron & Coal Company, operating Dover furnace, Canal Dover, Ohio, has gone on a three months' trip to Egypt.

Arthur P. Cox, formerly connected with the New York office of the American Steel & Wire Company, is now sales manager of the Dillon-Griswold Wire Company, Sterling, Ill.

Cecil B. Smith, who for the past three years has been resident engineer of the Canadian Niagara Power Company, with offices in Niagara Falls, Ont., has resigned to go to Montreal, where he has accepted an important position. The Canadian Niagara Power Company has appointed A. H. Van Cleve of Niagara Falls, N. Y., its resident engineer. Mr. Van Cleve is now resident engineer of the Niagara Falls Power Company, which position he will retain, thus serving both of the big power companies at Niagara.

W. W. Ricker, superintendent of the Niles Tool Works, Hamilton, Ohio, has been appointed to a responsible position in the general office of the Niles-Bement-Pond Company in New York City.

National Metal Trades Association Notes.

CINCINNATI, OHIO, December 5, 1904.—The anticipated trouble between the polishers and buffers at Detroit has materialized. On account of the refusal of the Clayton & Lambert Mfg. Company to change its scale of wages a boycott has been declared against it. At a meeting of the Employers' Association held recently the following resolution was adopted in reference to this strike:

Whereas, the Polishers' and Buffers' Local Union No. 1 of Detroit is maintaining a boycott against the Clayton & Lambert Mfg. Company for the purpose of compelling it to change its scale of wages to suit the Polishers' and Buffers' Union, now, therefore, be it

Resolved, That if upon careful investigation of the Brass Division Committee of the Employers' Association of Detroit the statements as made by the Clayton & Lambert Mfg. Company are found correct, then we do recommend that the matter be placed in the hands of the Executive Committee of the Employers' Association of Detroit, and that if said committee deem it necessary all the polishing and buffing rooms operated by our members be declared closed to the members of the Polishers' and Buffers' Local No. 1 until the boycott shall be officially rescinded.

The regular monthly meeting of the New York Metal Trades Association will be held at 3 p.m. December 8 in the rooms of the association. Immediately preceding this meeting there will be a meeting of the Executive Committee. The annual election will be held January 12, consequently it will be necessary that a Nominating Committee be appointed at this meeting to nominate officers to serve for the ensuing year. The employment bureau is finding much favor with employers and quite a number of applications have been received during the past week. Commissioner Eagan is now in New York City on missionary work connected with the association.

Mr. Wuest, the secretary, is confined to his home by a severe attack of rheumatism.

The New York Warrant Market.

The market for Pig Iron warrant certificates in the New York Produce Exchange showed a marked improvement this past week, the sales totaling up to over 8500 tons, which is by far the largest week's transactions since trading in these certificates was begun on the exchange. Of this amount 2400 tons were sold January delivery, the price fluctuating from \$17.20 to \$16.90; February, 1200 tons, from \$17.20 to \$16.90; March, 3600 tons, from \$17.10 to \$16.95; April, 500 tons, \$17.05 to \$17; May, 600 tons, from \$17.35 to \$17.05. One hundred tons December and July, respectively, were sold. The features of the market were the trading between calls and the transactions made for Pittsburgh account, several of the sales being made, we understand, for Iron interests in that city.

Prices since our last report show a general decline, the quotations established at noon Wednesday being:

	Bid.	Asked.
Cash	\$17.00	.....
December	16.90	\$17.20
January	16.85	16.95
February	16.85	17.00
March	16.90	16.95
April	16.90	17.05
May	17.05	17.20
July	17.10	17.40

The schedule of Pig Iron differentials has been published in circular form by the New York Produce Exchange. It gives a list of a large number of Northern and Southern brands of Pig Iron, covering all varieties and grades, and names the amount per ton to be paid with each kind of warrant when exchanged for certificates, as required in Rule 6, Section 1 of the Pig Iron Rules. Copies of this schedule can be had on application to the exchange.

Iron and Industrial Stocks.

NEW YORK, December 7, 1904.

Industrial stocks received a great deal of attention on the New York Stock Exchange during the past week, and prices have been quite firm, with some notable advances. Allis-Chalmers preferred advanced from 70 on Thursday of last week to 80½ on Tuesday of this week; Steel Foundries preferred from 50½ on Thursday to 57¼ on Friday; Colorado Fuel, from 55¼ on Thursday to 58 on Monday; Tennessee Coal, from 75 on Thursday to 77½ on Monday; Cast Iron Pipe preferred, from 78½ on Thursday to 80¼ on Saturday; United States Steel preferred, from 93 on Thursday to 95½ on Saturday, and the common from 31½ on Thursday to 33½ on Monday. Sloss-Sheffield preferred sold up to 105 on Saturday. Prices of other stocks ruled quite steady, fluctuations being within narrow limits, until Tuesday of this week, when a quite general recession set in, which carried prices in some cases considerably under the highest point reached during the week. Last transactions up to 1.30 p.m. to-day were made at the following prices: Can common 10½, preferred 57; Car & Foundry common 31¾, preferred 92½; Locomotive common 33, preferred 102½; Colorado Fuel 50¼; Pressed Steel common 39½, preferred 89; Railway Spring common 30¾, preferred 92¾; Republic common 15¼, preferred 68½; Sloss-Sheffield common 60, preferred 102½; Tennessee Coal 71½; United States Steel common 29½, preferred 91¾, new 5's 91¼.

The Bon Air Coal & Iron Company has sold to the Fourth National, the American National Bank and the Union Bank & Trust Company, all of Nashville, Tenn., a block of \$350,000 new general mortgage 5 per cent. gold bonds. These bonds are part of an issue of \$1,000,000 dated July 1, 1904, and due July 1, 1934, without option of earlier redemption; denomination, \$1000; interest payable January 1 and July 1 at Fourth National Bank, Nashville; trustee, Union Bank & Trust Company, Nashville; sinking fund 2 per cent. per annum. Of the authorized issue \$500,000 is reserved to retire at or before maturity \$410,000 bonds of the consolidated companies—viz., Bon Air Coal, Land & Lumber Company, \$170,000; Buffalo Iron Company, \$240,000. The company operates and owns in fee three coal mines with a daily capacity of 2000 tons of coal, also 200 coke ovens making coke for its two iron furnaces, which have a daily capacity of 200 tons of pig iron. The property includes 125,000 acres of coal and iron lands. Of the capital stock, consisting of \$2,500,000 each of common and 6 per cent. cumulative preferred in shares of \$100 each, there is outstanding \$1,850,000 of each class. The preferred has paid regular quarterly dividends of 1½ per cent. for several years.

Dividends.—International Silver Company has declared the regular quarterly dividend of 1 per cent. on the preferred stock, payable January 1.

American Can Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable January 1.

HARDWARE.

A desire to make the coming conventions of the various State associations of retail Hardware merchants successful is evidenced by the activity there is in the preparation of programmes for such gatherings. There is certainly the most abundant encouragement for those in charge of these large interests in view of the success which has been attained. What was a few years ago a comparatively weak and uncertain movement has now become a recognized power, which is more and more entering into relations with jobbers and manufacturers. In view especially of the course of things in connection with catalogue house competition and the efforts of the able and influential Joint Committee to protect merchants, there should be a larger and more representative attendance at the coming conventions than ever before. Those in charge of these interests are wise, however, in not relying upon the importance or even the success of such defensive efforts to secure the coming together of merchants in such numbers as adequately to represent the retail trade of the various States, and in giving thought and care to the detailed arrangement of useful programmes which will secure the discussion of subjects of a practical character by the most competent men. While it is very well to make the correction of trade evils one of the subjects of such organizations, the opportunities afforded in the annual or semiannual meetings for conference on business methods, for a general interchange of views and for personal contact with the leading men in the trade, together with the cultivation of a fraternal spirit and the general broadening and stimulating influence of such assemblies, must be prominent among the reasons which justify the association movement. It is indeed not unlikely that the success of the movement will in the long run depend upon the practical usefulness of the associations to their membership. Those who are taking pains, often at the cost of considerable personal inconvenience and labor, to make the conventions interesting and serviceable are doing a most commendable work in which they should have the hearty support of the trade.

Attorney-General Moody has dealt a severe blow to so-called "guessing contests," which have become very common in connection with selling goods in the United States, by an opinion prepared at the request of the Postmaster-General. Fortunately for such contests already inaugurated the ruling does not apply to them, according to an order promulgated by the Post Office Department, which follows: "In view of two recent cases in which the Supreme Court and the New York Court of Appeals rendered opinions, the Postmaster-General feels warranted in again submitting the question to the Attorney-General. Following the opinions in these two cases, the Attorney-General now holds that the schemes are lotteries. As a number of legitimate business enterprises have adopted these estimating or guessing contests as a means of advertising, and in view of the admission to the mails of matter pertaining to these contests within the last few years, the elimination of these schemes from the mails cannot be made immediately absolute. If such a scheme has already been entered upon in good faith, the department will not issue an order that will seriously injure a legitimate business. Each case will be handled separately, and no scheme which involves the plan ruled against by the Attorney-General will hereafter be allowed to commence operations." Previously to this opinion and to the

decisions upon which it is based, the Post Office Department has founded its judgment of these contests upon decisions which held, to quote one of them, "that calculation, foresight, knowledge, inquiry and information enables the participants to approximate the correct results and the use of the mails in promoting such enterprises is not a violation of the law." The Attorney-General states "that a comparatively small percentage of the participants will realize their expectations. Thousands will get nothing." This decision is so sweeping that it will have a serious effect in stopping a method of advertising that many business men do not consider legitimate.

Condition of Trade.

The exceedingly favorable conditions which have been more and more characterizing the market during the past few months still continue, making the outgoing of 1904 one of promise for the new year. The market is showing a growing strength in the matter of prices, and advances are being made frequently in goods which are most directly affected by the cost of material which enters into them. Buying has naturally been stimulated, and merchants have been purchasing more freely and covering their requirements for the early trade at least of next year. Manufacturers, however, are reluctant to book orders far ahead, and in many lines are limiting contracts to early deliveries. In some branches, however, quotations are being withdrawn, awaiting the developments of the market. Matters connected with the closing of the accounts of the year and relating to activities and efforts for next season are naturally receiving attention from both merchants and manufacturers, but under the stimulating and encouraging circumstances which prevail current business occupies the energy of the trade in good measure. The cultivation of holiday business is evidently a growing feature of the Hardware trade, as indicated especially in the large variety of goods which are more and more becoming prominent at this season in Hardware establishments, thus making the Hardware store more attractive than of old, as articles within its legitimate province or lying close to it appear in large variety to supply the demands of the public at this season, nearly all of them being of practical utility or directly related to the activities of the winter. In connection with these matters which have to do with the regular course of trade there are many questions, such as the competition of catalogue houses, the principles which should govern the distribution of goods, the disturbance caused by sales on the part of jobbers and manufacturers to consumers, which present problems which must be considered, and in one way or another must be met by the trade. The disposition to discuss these subjects together by the various classes interested is one of the gratifying features of the times.

Chicago

Reports which were published last week in the daily papers about a \$4 advance in Wire, a \$2 advance in Pipe and immediate advance in Bars are without foundation of fact up to the present moment. It is not impossible that higher prices in these and other Heavy Hardware lines may be named before long, owing to a variety of causes, chief of which is the increasing cost of Pig Iron, Scrap Iron and Steel and raw materials in general. The air is full of rumors of advances, but few more actual price changes are expected to be put into effect until January 1, when a liberal crop of advances is looked for if present favorable conditions continue and raw materials continue to maintain strength. The cold weather and snow of last week in the West have resulted in a rush for holiday goods, particularly Skates and Sleds,

that has fairly swamped the jobbers. It is now becoming apparent that the predictions made in these reports during the dull season last summer, that the year 1904 would compare favorably with any previous year, are likely to be realized. All indications also point to an extremely prosperous business for 1905.

NOTES ON PRICES.

Wire Nails.—Since the advance in the price of Wire products on November 16, a large tonnage has been booked by the leading manufacturer, in which Nails hold a prominent position. The company's capacity is such that it is unlikely that the trade will suffer any immediate inconvenience from want of Nails, though the company will go into the new year with a comparatively small stock, which is not usually the case. To offset this it is thought that orders placed for shipment in November and December would have been placed for shipment after January 1, if it had not been that the trade were restricted to 30-day deliveries during a portion of the time, and that advances in price were, and are still, anticipated. Up to the time of writing no further advance in prices has been announced by the leading interest, though some of the independent mills have advanced their price for carload lots to \$1.75, base, f.o.b. Pittsburgh. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Carload lots.....	\$1.70
Less than carload lots.....	1.75

New York.—Demand keeps up in the local market unusually well for the season, although it shows some falling off from that of the preceding month. Dealers generally have enough Nails to last them until the first of the year, with the exception perhaps of sorting up stocks a little. Inquiries are being received regarding the placing of orders for January shipment. The market is firm at the following New York quotations: Single carloads, \$1.89½; small lots from store, \$1.95.

Chicago.—There is a continued business of fair proportions coming to mills. We quote carload lots to jobbers \$1.85, base, f.o.b. Chicago; less than carload lots \$1.90, base, with 5 cents advance charged to retailers.

Pittsburgh.—Despite daily press reports to the contrary there has been no official advance in prices of Wire Nails by the leading interest. It is a fact however that some of the independent mills have taken the initiative and have advanced Wire Nails to \$1.75, base, f. o. b. Pittsburgh, for carload lots. It seems to be a matter of only a short time until a general advance in prices is made and with this in view the trade is placing heavy orders with the mills for shipment within 60 days from date. We understand that some of the mills are pretty well oversold and are not making prompt deliveries. While we repeat quotations of last week, it should be noted that the minimum price of some of the mills is 5 cents a keg higher. We quote Wire Nails in carloads to either jobbers or retailers at \$1.70, and in less than carloads at \$1.75, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days.

Cut Nails.—The recent advance in Nails is steadily maintained, with quite an active demand. When an advance in the price of Wire Nails takes place it is the purpose of the Cut Nail Association to make a corresponding advance in Cut Nails. One of the mills outside of the association has already advanced its price to \$1.75 base, in carload lots, and other mills are so full of orders that they are practically out of the market. Quotations are as follows: Carload lots, \$1.70; less than carload lots to jobbers, \$1.75, and to retailers, \$1.85, f. o. b. Pittsburgh. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities, 5 cents advance per keg on Steel Nails.

New York.—A moderate demand continues, about in the usual proportion to Wire Nails. New York quotations are as follows: Carloads on dock, \$1.84; less than carloads on dock, \$1.89; small lots from store, \$1.95.

Chicago.—Conditions remain unchanged, with a fair demand. Quotations remain as per last week's report.

Pittsburgh.—Demand for Cut Nails is quite active and

we are advised that the recent advance in prices is being maintained. Should an advance be made in Wire Nails it would at once be followed by an official advance in Cut Nails. One of the leading mills in this district is holding Cut Nails at \$1.75, base, per keg, and states it is entering good sized orders at this price. We quote Cut Nails as follows: Carloads, \$1.70, base; less than carloads to jobbers, \$1.75, base; less than carloads to retailers, \$1.85, base, plus carload rate of freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities are 5 cents a keg higher than above prices.

Barb Wire.—In view of the anticipated advance in prices demand continues fairly heavy, although the season is well advanced. Independent mills have, in some cases, advanced their prices \$1 per ton. Prices continue firm, on 60-day contracts, for definite quantities only. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.85	\$2.15
Retailers, carload lots.....	1.90	2.20
Retailers, less than carload lots.....	2.00	2.30

Chicago.—The lateness of the season is not having the effect of reducing demand to small proportions, as is generally the case. Quotations are as follows: Jobbers in car lots, Painted Wire, \$2; Galvanized, \$2.30; retailers, car lots, 5 cents higher; less than car lots, \$2.15 Painted; \$2.45 Galvanized. Staples, Bright, \$1.95; Galvanized, \$2.25.

Pittsburgh.—The season is well advanced, but in spite of this demand continues quite heavy, largely because the trade expects another advance in prices before long. Several of the leading independent mills have already advanced their prices \$1 a ton. The mills continue to limit shipments to 60 days from date of contract and for definite quantities only. Prices continue very firm and there is no shading whatever. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.85	\$2.15
Retailers, carload lots.....	1.90	2.20
Retailers, less than carload lots.....	2.00	2.30

Smooth Fence Wire.—Orders are still being placed in quite large volume, owing to the expected advance in prices. Some independent mills have taken the initiative and advanced their prices \$1 per ton. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.55
Retailers, carloads.....	1.60

The above prices are for base numbers 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—Demand is fairly active, but not quite as heavy as before the recent advance in prices. Quotations, which are limited to 60 days' sales or a shorter period, are \$1.70, base, in car lots to jobbers, and \$1.75 in car lots to retailers on Annealed Wire, and 30 cents advance for Galvanized. Less than carloads take an advance of 5 cents above these prices.

Pittsburgh.—Demand continues quite active in spite of lateness of the season, largely due to an expected advance in prices, which has already been made by some of the independent mills to the extent of \$1 a ton. It is believed the leading interest will make an advance in all kinds of Wire products before long. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.55
Retailers, carloads.....	1.60

Clothes Wringers.—The manufacturers of Clothes Wringers have made an advance ranging from \$1 to \$2 per dozen on Clothes Wringers. This is on account of the higher prices which are ruling for Rubber.

Rivets.—An advance of 5 per cent. has been made by the associated manufacturers of Iron and Steel Rivets and the market is characterized by a decidedly firm tone.

Copper Rivets and Burrs in sympathy with the Copper market are held firmly at the advanced prices.

Wood Screws.—At the recent meeting of the associated manufacturers of Screws former prices were reaffirmed. The market on this line is more even and stronger than it has been for a long time, and there is evidence that the stocks purchased at former low prices are becoming depleted.

Heavy Goods.—The prices for goods which lie near the raw material are in general very firmly unfaintained and advances are in many cases being made, not so much in the way of the announcement of new and definitely higher prices as in the withdrawal of exceptional prices, special discounts, &c.

Window and Door Screens.—The outlook for the sale of Screen Doors and Window Screens during the coming season is regarded as quite satisfactory so far as volume of business is concerned. Jobbers in most markets are understood to be pretty well cleaned out of goods in this line, a fact which is especially gratifying, as the past two or three summers have been cold and damp in many parts of the country. Jobbers have been apparently careful in making up their specifications for the past year or two. Prices on this line have been unsatisfactorily low, practically on the same level as last year. The manufacturers, even those who made Screens under the most favorable circumstances, it is claimed, were unable to show a reasonable profit, their margins being uncomfortably close. Some of them, indeed, had, it is said, to look cheerful in spite of an actual loss on the season's business. There seems to be a disposition, however, on the part of everybody to stay in the field and to hope for better things in the near future, although there is little indication of an improvement in prices.

Sash Weights.—The Sash Weight market is showing decided strength and advanced prices are generally announced. It is feeling the effect of conditions in the Iron market and manufacturers report that it is difficult to obtain raw material to meet prompt requirements. Under these conditions quotations on Sash Weights made by leading manufacturers are generally not only higher, but are subject to change without notice. Manufacturers, too, are pursuing a conservative course and refusing to accept orders for future delivery. In view of the different conditions that prevail in different sections of the country and with the various foundries, there is a good deal of unevenness in quotations. The market may, however, in a general way be said to be represented by the following quotations, f.o.b. factory:

Eastern district.....	\$22.50 to \$24.00
Southern district.....	18.00 to 19.50
Western and Central districts.....	19.50 to 21.00

Coil Chain, Traces, &c.—As a result of the course of things in the Iron market, the prices of Chain have recently been more firm, manufacturers withdrawing exceptionally low quotations and refusing to make concessions which have until lately been frequent. As we go to press there is in session at Pittsburgh a largely attended meeting of the Chain manufacturers. In view of the higher prices for raw materials and the general advancing tendency in prices for finished products it is not unlikely that an advance in Chain will be determined upon.

Rope.—During the week under review advances have been made in the prices of both Manila and Sisal products, owing to the higher value of the raw material. Manufacturers are quoting pure Manila Rope at 12½ cents per pound and pure Sisal at 10 cents per pound. A ¼-cent rebate is allowed in larger lots, while ½ cent below the quotations is said to be the minimum price to largest buyers. Mixed Manila Rope is quoted at 10 to 11¼ cents, and Mixed Sisal at 8¼ to 8½ cents. Demand is on a winter basis.

Glass.—Last week a meeting of the Executive Committee of the Manufacturers' and Jobbers' Window Glass Association was held in Pittsburgh, at which a secret rebate plan was formulated by which jobbers in the association may continue to handle the best Glass made by the association manufacturers, thus being protected against outside inferior brands which are being put on

the market at low prices. The rebate is to be paid by the manufacturers on March 1, 1905. It is reported that a revision of the first three brackets was considered during the meeting, but this is without official confirmation. Manufacturers report a good demand, with a favorable outlook for a continuance of this condition for some time.

Oils.—*Linseed Oil.*—An advance in the price of State and Western Oil was made December 3 to 40 cents per gallon. It is reported that some crushers are asking from 41 to 43 cents. The first price named is the lowest for any quantity, and crushers are more ready to sell small quantities than large ones. In fact the market is very firm at 40 cents. The advance was made because of the upward tendency of seed. Crushers contend that the average cost of the seed that they have purchased and now have on hand leaves little or no profit in 40-cent Oil. No change has taken place in the price of City Oil. Quotations are as follows: State and Western Raw, 40 cents. City Raw, in lots of five barrels or more, 41 cents; in less than five barrels, 42 cents per gallon.

Spirits Turpentine.—The downward tendency of prices continued until on December 3 the price in machine made barrels dropped to 47¼ cents in Savannah and 50 cents in the local market. Heavy buying at both points arrested the demoralized market, which began to advance, and so continued until it reached 53 cents. The advance of 3 cents per gallon from the lowest price has had the effect of checking buying in this market to a considerable extent. Quotations in New York, according to quantity, are as follows: Oil barrels, 52½ to 53 cents; machine made barrels, 53 to 53½ cents per gallon.

PRICE-LISTS, CIRCULARS, &c.

SCREEN DOOR & WINDOW COMPANY, successor to John Laverock & Co., Owosso, Mich.: Catalogue illustrating Screen Doors in a variety of patterns, and Adjustable Window Screens.

PRACTICAL NOVELTY COMPANY, 427 Walnut street, Philadelphia, Pa.: Illustrated catalogue of the Practical Trousers Hanger and Press, with description and testimonials.

THE HART MFG. COMPANY, Greenville, Ohio: Catalogue illustrating Screen Doors in a variety of patterns, some of which are new for 1905, also Window Screens of various patterns. The company also makes the Hart Curtain Stretchers.

BUTLER BROTHERS, New York: Catalogue No. 521, under date of December, 1904, the prices in which are guaranteed during December or until their January catalogue is issued. Goods are sold by the firm at wholesale only. The catalogue contains 436 pages.

OWOSSO MFG. COMPANY, Owosso, Mich.: Illustrated catalogues devoted to Plain and Fancy Screen Doors, Window Screens and Window Screen Frames, Scythe Snaths, Snow Shovels, &c.

HENRY TROEMNER, 911 Arch street, Philadelphia, Pa.: Illustrated price-list of Steel Pivot, Steel and Agate Bearing Scales. The Scales are provided with the new patent rubber cushioned fork that holds the scoop, saving both scoop and Scales from injury, preventing the scoop sliding about and making operation noiseless. The line of Scales includes Scoop Counter, Butter, Meat, Ball Scales, Balance Scales, &c. The catalogue also shows Pans, Scoops, Twine Boxes and Reels, Coffee Mills, Canisters, &c.

THE FERROKRAFT COMPANY, Cleveland, Ohio: Pamphlet entitled "Advance Sheets of the Ferrokraft Book," in which the Stevens Catch, automatic and springless, is illustrated and described. This Catch is designed for use on cupboards, bookcases, basement windows, sideboards, cabinets, refrigerators, buffets, wardrobes, bank rails, wickets, &c. The company is intending to add from time to time other specialties which may be carried by Hardware merchants.

HAYDEN IMPLEMENT COMPANY, 46 Duane street, New York: Circulars showing modern Cleaning Appliances for cleaning floors, windows, walls, &c.

DEATH OF JAMES H. WILLIAMS.

JAMES H. WILLIAMS, founder and head of J. H. Williams & Co., died suddenly of apoplexy at his late residence, 6 Pierrepont street, Brooklyn, Monday morning, December 5, there having been no preceding illness.

Mr. Williams was born at Fort Plain, N. Y., 59 years ago, and established the drop forging business which bears his name in a modest way at Flushing, L. I., in



JAMES H. WILLIAMS.

1882, under the style of Williams & Diamond. On July 1, 1884, the business was moved to Brooklyn and re-established at the present location on Richards, Bowne and Columbia streets, near Hamilton Ferry, the style changing to J. H. Williams & Co., which has since been retained, and was incorporated July 1, 1895, Mr. Williams becoming president.

To this enterprise were devoted the thought and energy of Mr. Williams' business life and in a modest and unassuming way it has had the personal care and attention of its creator ever since its foundation. For something like ten years he had been a partner in the firm of Bliss & Williams, now the E. W. Bliss Company, the two partners being cousins.

The business of J. H. Williams & Co. has had two marked and different kinds of success, as it may be regarded in its financial aspect or in view of the relations between employer and employees. Mr. Williams was possessed of a keenly practical mind and had a horror of seeming to operate a benevolent institution. His purpose was to build up a business on its purely business side which would become strong, remunerative and permanent, and he was convinced that this could be accomplished without neglecting humane considerations or overlooking the welfare of his work people. Possessed of these views, it was natural he should be among the earliest to take up a line of industrial betterment in an earnest endeavor to accomplish what was possible to make the daily toil of the operatives not alone properly remunerative, but healthful and comfortable. He used to say that any plan of industrial progress must rest on a foundation of good wages, that no money spent on conveniences or comforts could rightfully usurp the place of good wages. He sought business success, yet never forgot that to his business success the labors of his employees contributed as well as his own individual efforts. The substantial and enduring evidence that his work was wisely planned and well executed is not only the large establishment he founded and developed, but the feeling throughout the entire plant, among employees, that in his death they have lost not only a master but a sincere friend. He personally knew most of the large number of workers in

his employ and highly valued their respect and esteem. In this connection it is significant that the manufacturing history of the company has been distinguished by the absence of labor troubles.

His death comes at a time when the works were in process of being greatly enlarged to meet the steadily growing demands upon their productive capacity. He leaves, however, a corps of men and associates taught and trained by himself to take his place, so that the business will proceed without interruption along the lines laid down by him.

Mr. Williams was a public spirited citizen of the highest character, and interested in religious and philanthropic work, but was exceedingly modest, never having sought publicity or public station. He was very domestic in his tastes and habits. He was a member of the Hamilton Club, Marine and Field Club and the Riding and Driving Club. He is survived by a widow, a daughter and two sons.

DEATH OF R. K. CARTER.

ROBERT K. CARTER, president of R. K. Carter & Co., New York, died at his home in this city, December 2, of heart failure, after an illness of several months. Mr. Carter was born at Carter Hall, near Winchester, Va., March 12, 1839. He was educated at the University of Virginia, and also graduated from what is now Washington and Lee University Medical School. During the late Civil War he served the South as a surgeon in the Southern army. Coming to New York after the end of the war he entered the employ of Yale, McFarland & Co., in 1866. Later he connected himself with the wholesale Hardware house of Bliven & Mead, subsequently Hart, Bliven & Mead. In 1870 he established himself in business on his own account, that of buying goods for merchants in the line of Hardware, Iron, Steel, Mill, Mining and Railway supplies. The beginning although moderate both as to number of dealers represented



ROBERT K. CARTER.

and volume of purchases, slowly but surely grew to large proportions, the purchases of the house now going to widely scattered sections of this country and to some concerns abroad. In 1891 a copartnership was formed with Frank R. Blauvelt, under the style of R. K. Carter & Co. The business was incorporated in 1900 under the same title, Mr. Carter becoming president, Frank R. Blauvelt, vice-president, and Alfred C. Greening, secretary and treasurer. To Mr. Carter belongs the distinction of having been one of the pioneers in the line of business with which his name is associated, in the building up and carrying on of which he manifested a marked ability. Mr. Carter is survived by a widow and two children.

THE CATALOGUE HOUSE QUESTION.

LETTER FROM THE JOINT COMMITTEE.

St. Louis, December 6, 1904.

To the Editor: It has been the earnest desire of this committee to avoid controversies in the press, but a letter published by Wells & Nellegar Company of Chicago in *The Iron Age* of November 24 gives such wrong impressions that after careful deliberation we have decided we cannot allow that letter to pass without giving the trade the facts.

Three members of our committee, Mr. Corey, secretary of the National Retail Hardware Dealers' Association; Mr. Kirk of St. Paul and Mr. Norvell of St. Louis, met in Chicago to attend to certain business in connection with our committee work. We did not go to Chicago with the object of calling on Wells & Nellegar Company. However, having heard that they were selling very largely to the Chicago catalogue houses, we decided to make a friendly call and ask their co-operation.

We had the pleasure of first meeting Mr. Wells. He admitted they were selling catalogue houses, and stated they used them largely to clean up stock. He seemed inclined to work with us. Just as we were leaving Mr. Nellegar came in. Our conversation was reviewed. He declined point blank to give us any immediate assurance that they would discontinue selling catalogue houses, but stated he would within a few days write the chairman of our committee a letter defining the position they would take in the matter with us. The correspondence was published by Mr. Corey in the "Bulletin," which goes to the members of the Retail Hardware Dealers' Association.

The Wells & Nellegar Company is absolutely mistaken in its statement that the company was requested to print on its stationery "We do not sell catalogue houses." This idea occurred to one of the members of our committee a considerable time after this meeting, and was not adopted by any jobbers, either associated members or independents, until several weeks later.

At the time we called upon them neither Mr. Wells nor Mr. Nellegar told our committee that they preferred not to discuss this question with us. The mere fact that they agreed to write us a letter within a few days and state their position to us clearly, and the fact that they did write a letter, bears out this statement. As a matter of fact, they did discuss the catalogue house question with us at considerable length, and in many of its bearings.

While it does not say so in plain language, the rest of the company's letter gives the impression that the catalogue house committee spread reports that they were about to sell out, about the failing health of Mr. Wells and of Mr. Nellegar. Both gentlemen seemed to be in excellent health at the time we saw them. As our committee knows nothing whatever of such matters, and as we have never spread any such reports, we believe this part of the letter, either intentionally or unintentionally, does us an injustice.

We are glad to note from its letter that the Wells & Nellegar Company will not sell catalogue houses in the future. The company, however, gives the impression in its letter that it was waited upon by its business competitors. It fails to state that of the three gentlemen who called on the company's representatives one was Mr. Corey, secretary of the National Hardware Dealers' Association, and that in the conference with them he spoke as the official representative of several thousand retail Hardware dealers. Therefore the following statement in the letter seems somewhat out of place: "Now as to the catalogue houses, we are refusing to sell them and will not sell them and we decline to sell them, because it is to the interest of the retail trade and not because of some theory of a competitor." Mr. Corey was at that meeting as the representative of several thousand associated retail Hardware dealers, and took a leading part in the discussion.

It seems that the Wells & Nellegar Company was selling the catalogue houses at the time our committee called. Our committee represented both jobbers and retailers. Since then the company has had a change of

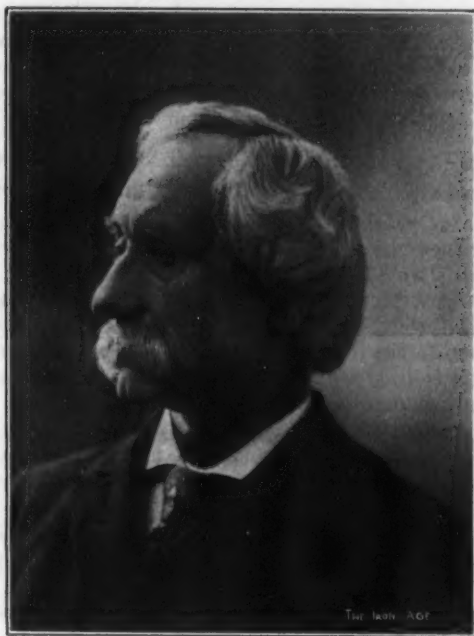
heart, for which we are very glad, and we only regret in announcing its new attitude toward catalogue houses that it has given some very misleading impressions.

WHOLESALE AND RETAIL HARDWARE JOINT COMMITTEE.

DEATH OF JAMES N. FRYE.

JAMES NICHOLAS FRYE, for the last half century a member of Frye, Phipps & Co., Boston, died on the 3d inst., at his home in Brookline. Mr. Frye arose about 7 a.m., and was out of bed only a few moments when he was stricken down by heart trouble, dying almost instantly.

Mr. Frye was born in Concord, Vt., on October 3, 1828. He passed his early boyhood days on his father's farm in Concord. At the age of 15 he found himself thrown much on his own resources through the death of his father, his mother having died while he was in infancy. He obtained what education he could in the public schools, and a few years later he found it possible to enter St. Johnsbury Academy, being registered with the class of 1849. While studying there he held a position in



JAMES N. FRYE.

the post office, and it was through acquaintances formed in this capacity that he secured the opportunity to enter the employ of Montgomery Newell, at that time in the wholesale Hardware trade at 83 State street, Boston.

By making his employer's interests his own Mr. Frye won his way step by step up the ladder of success, until in six years' time he was admitted to partnership in the concern for which he had labored so faithfully, the firm having then been in existence more than a third of a century.

At the time Mr. Frye was admitted to partnership, in 1855, the firm name was Wells, Coverly & Co., the business having been purchased from Montgomery Newell. Then it was changed to Coverly, Frye & Co., remaining so until 1858, when it became Coverly, Frye & Knapp. Two years later it was changed to Coverly, Frye & Co., remaining so from 1860 to 1864. In 1865 a co-partnership was formed with John A. Phipps and W. H. H. Porter, and it was through the combined efforts of these men that the house gained for itself an unbroken reputation for integrity and high order of business management. Thus the firm, through its various changes, has had an uninterrupted career of nearly half a century in Boston. In the great fire of 1872 the granite store of the company on Federal street literally melted out of view, but in 24 hours the firm was re-established in new quarters and ready for business.

During the past few years Mr. Frye, although interested in the business, had left the detail and management

to his partners, E. Loring Richards and Albert M. Wiley. He was an active member of the New England Iron and Hardware Association, and was a delegate from that body to the State Board of Trade, in which organization he held the position of vice-president and a member of the Executive Council. He never relinquished his kinship with Vermonters, and was instrumental in forming the Vermont Association of Boston, of which he was vice-president.

A devotee of the rod and gun, he was among those who established, in 1875, the Massachusetts Rifle Association, of which he afterward was elected president and later an honorary life director. Also he was connected with the old Tremont Sportsman's Club, and with the Megantic Club until he left to join the Winchester Club, whose game preserves lie near Caxton, Canada.

Mr. Frye was highly respected in Boston as a business man and had a great number of warm personal friends throughout the trade.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Can an Instrument Be Negotiable Whose Exact Value May Not Be Determined at Any Time?

From a Prominent Merchant: Owing to an apparent unwillingness on the part of certain country banks in the South (we do not know how it may be in other sections) to pay their own or customers' checks at par, their correspondents in the larger money centers have in many cases been forced to collect such checks by express. This, of course, called for the paying out of currency—exactly that result which the smaller bank wishes to avoid.

Various devices have been employed to get around this obligation. A check came into the writer's hand a few days ago in payment of an ordinary debt for merchandise, which was stamped as follows: "Negotiable, but payable only through a bank or banker in New York exchange, less current rates therefor." This was sent to our correspondent bank in the neighborhood, and it was returned, inasmuch as it was deemed not negotiable.

There is no telling what the bank drawn on would consider the current rates of exchange, and certainly no obligation on the part of creditor to accept less than par for the check.

A great many new banks have been established in the last year or two owing to the accumulation of money in the agricultural districts, and the fact is that a good many of these new financiers have yet to learn what their exact obligations are to customers, to the banking fraternity and to the public. But the point that the writer wished to raise with *The Iron Age* is whether any instrument could properly be called negotiable whose exact value was not determinable by its face at any time.

Neglected Opportunities.

From the Secretary of One of the Western Hardware Associations: Our association is gradually getting stronger, and we know that if all the good merchants in our State who feel that they ought to have a hand in this movement would get down to the *doing it now* we would have a banner organization. Their neglect in this proves to me that the world's opportunities are yet to the swift and strong and the new man need never despair so long as his competitor is lax and slow in doing the right thing.

Why Some Business Men Do Not Succeed.

From a Veteran Pennsylvania Merchant: The writer in looking back over a vista of 40 years' business recalls many instances where apparently level headed men failed to make a success of business, although they worked hard. Some essential element to success was, however, lacking.

In some cases the cause is easily traced, as, for instance, the writer recalls where an agent had been appointed for the sale of a Steam Heater and claimed he could not find sale for it. I visited his establishment, and did not see one set up for exhibition. I asked him where the sample heater was. He pointed to a door in the rear of his store and said I would find it out there. I proceeded to investigate and found the door opened into a dark space. I advanced cautiously, and, notwithstanding my caution, I fell over a pile of charcoal. I picked myself up and reported that I did not find anything but charcoal. "Oh," he apologized, "the heater is back of the coal." I struck a match, and sure enough there it was, just as he had received it from the railroad station, except for the coal dust and cobwebs. It is scarcely necessary to say the agency was given to another.

In another case the writer traveled almost to the Canada line (about 500 miles) to examine a steam heating apparatus that was not satisfactory, and found nothing wrong except that it needed cleaning. I stayed 24 hours and satisfied the owners that all they wanted was to know how to handle the heater. The agents had not taken enough interest in the matter to give the necessary instructions.

Now these are specimens of methods practiced by unsuccessful business men. As the character of a man is judged by the company he keeps, so the success or failure of a man can be safely foretold by his surroundings; for instance, when you approach a store and find the goods in the show windows in utter confusion, the glass semi-transparent owing to accumulated dust, and the few goods in the windows covered with the same sombre material. You step inside the store and the same careless condition prevails. If you inquire of his customers they will tell you he is good at making promises, but seldom fulfills them. Such a man never makes a success of business.

As I see it, the essentials to success are integrity, energy, industry, the ability to forecast the future, and, above all, not being afraid to put the shoulder to the wheel when business requires it.

MANUFACTURING COST.*

THIS is the title of a late and interesting addition to the literature of cost keeping from the press of the Bookkeeper Publishing Company, Detroit, Mich. It is by H. L. C. Hall, vice-president of the International Accountants' Society. It contains 180 pages with a number of diagrams and forms reproduced in such a way as to indicate their use. This small volume contains a concise statement of the general principles relating to the subject of cost keeping, with a description of approved methods in the various departments of the system. After touching upon reasons for keeping a record of actual costs of manufactured products, it takes up the organization of the factory, the manner of dealing with the elements of cost—namely, raw material, labor and expense—after which the purchasing department, management of storeroom and toolroom are briefly discussed, while the keeping track of labor costs naturally calls for more detailed attention. The treatment of the subject is characterized by clearness and a clean cut statement of principles which enables the volume, though of moderate size, to cover satisfactorily in a compact and condensed form a comprehensive description of methods of keeping and recording costs. The book, as practical and up to date, is more serviceable and comprehensive than more pretentious volumes.

W. H. HATHORNE, Western representative of the J. R. Torrey Razor Company, and J. R. Torrey & Co., manufacturers of Razor Strops, Worcester, Mass., died at the Burnett House, Cincinnati, Ohio, on the 18th inst., after a brief illness. Mr. Hathorne had traveled for these interests for the past 30 years and had made many friends, by whom he was held in high esteem.

* MANUFACTURING COST. By H. L. C. Hall: Cloth bound, 180 pages, illustrated. Postpaid, \$2.00. For sale by David Williams Company, 232-238 William street, New York.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

NEWSPAPER ADVERTISING.

First Article.

BY SPECIALIST.

Change advertisements every week.

Put individuality into your advertising.

Feature some one thing and give facts concerning it.

Talk convincingly and use details that will interest.

Make your show windows co-operate with newspaper advertising.

There's more than one kind of good Publicity, —so use all of them.

THE STORY OF SCISSORS

Years and years ago, in a big mill where shears were the exclusive product, one of the master-workmen conceived the idea of quietly making a very small,—almost tiny,—pair of shears. When they were finished, he sent his apprentice for the masters of the mill. The boy had simply bidden them come, and as he led them to the unusual exhibition, he proudly shouted, upon reaching the spot:—

"See, Sirs!"

Thus it was that scissors were named.

The scissors and shears that we sell bear our name etched in the metal. We are not ashamed of them. The kind we can't guarantee, we don't want to know about.

Everything from manicure scissors to 12-inch shears, and for every use that a woman can conceive of.

REMEMBER! Our mail-order department "works while you sleep." A postal does your part,—we do the rest.

There's an advertisement that sold goods, so it must be a good one. Scissors are very prosaic things, indeed. Everybody knows what they are. To have headed the ad. with just the word "Scissors" would have promised nothing, but headed as above it promised to enlighten one on a familiar subject. Of course, the story is fanciful, for the real origin of the word Scissors is of Latin derivation. But, as is said above, it sold goods, and lots of them, too. (The mail order part of the above ad will be covered in a later article. In the meantime you can add a Christmas thought in the above and use it. Early suggestion causes early Christmas buying.)

Complexity of Advertising.

No one rule for newspaper advertising will fit every city, for, primarily, the community, its nature, its geographical location and its degree of prosperity all enter into the subject of the advertising possibilities, but the situation, from time to time, will be covered broadly. You will have to adapt it to your own needs.

Five-Inch Space Best.

It is very hard to get any sort of value from newspaper advertising that measures less than five inches. The same uniform space should be used in every paper in your town, so that the same "copy" can be used in all papers. No one paper covers its field thoroughly, but all the papers will. The position of your advertisement is of great importance, so get it on the local news page. Steer clear of those inside pages. They might be glued together for all the good the inside pages are to a local advertiser. Having the space and the position, then proceed to

Say Something!

Take your subject and give it an interesting head. Make it look to the reader whom you would attract to it as if it would tell an interesting story. Then make it do that very thing. A Knife advertisement, for instance, that I recently saw in *The Iron Age* was headed "A Woman's Invention." It told a readable story, and it sold goods, as every advertisement made on those lines will do. In newspaper advertising you can safely wager that three-quarters of its readers are women. Men make the money, women spend it, and they dearly love to do it, too. There's no ethical crime in taking advantage of that fact. Appeal to them, then, and to make a woman buy there's nothing like shaving a cent off, making a price odd or even, but in penny-ending amount. Women are inquisitive, and so a story must be adequate and meet all requirements of description of the featured article. Beware of fine phrases! Be simple worded. Be practical. And don't forget that a sunshiny advertisement makes the readers "warm to it."

Change Frequently.

A newspaper advertisement ought not to be allowed to stand longer than a week, and it may outgrow its usefulness by cleaning a stock out in less time. Frequent change of copy, then, is necessary. Have your advertising written a week ahead, so you can edit and revise it. Then get it to the compositor about Wednesday. Insist on seeing a proof, and have type kept standing and corrections made until proof is O. K. Then order it inserted the following Monday. The reason for this is simple. Compositors are busy people, and, naturally, Monday (for an evening paper) or Saturday and Sunday (for a morning paper) are busy days. So if their convenience is considered, they will show their appreciation by giving a more studied "set-up," and that's very much to be desired.

Window Co-operation.

While a certain subject is running in the newspaper advertising keep a show window to agree. On a Wire, so that the bottom of the card suspended to it will be on the eye level of the outside reader, have a card printed in 2-inch type:

AS ADVERTISED
THIS WEEK.

Many who read your ads are prone to forget, and many who see your window exhibition will hunt up the advertisement. One helps the other, and both sell goods. Should you have two show windows, have the second one contain a sign—

AS ADVERTISED
LAST WEEK.

—thus reminding those who may have forgotten to buy that of which they made a mental note the "other day." Keeping two windows up to date will sell goods, anyway; but keeping them in accord with their co-worker in point makes the goods go, and the particular means points the value of system.

"TRADE TIPS."

THIS is the title of an interesting pamphlet issued by J. J. Snyder & Son, Brooklyn (Flatbush), N. Y., a house which is much better known throughout the section cultivated by it as "Snyder of Flatbush." The frontispiece is a portrait of John J. Snyder, Sr., the founder of the business, the opposite page containing an introductory under the heading of "The House of 'Snyder of Flatbush,'" as follows:

In 1871 Mr. John J. Snyder, Sr., partitioned off a space 15 feet square, in a building on the corner of Grant and Locust streets (now Bedford and Snyder avenues), and called it a "Hardware store." Strict attention to business, courtesy, honest methods and progressiveness made the venture successful.

While 33 years of diligence have not brought a return that is, in any respect, "marvelous," the steady and ever increasing patronage of an appreciative public has made constant changes and additions necessary. Our store to-day covers a plot of ground 50 x 105 feet, embracing a floor space of 10,500 square feet.

One of the factors contributing to our success has been the willingness with which we have imparted information and advice in regard to the use of the goods in our varied lines of merchandise.

A friend suggested that we compile as many as we could bring to mind of these "trade tips," publish them in book form, and present them to our patrons. We adopted the idea, and hope that this booklet will be an aid to those into whose hands it falls.

It will be noted that one of the principles observed in the conduct of the business is the special desire on the part of the proprietors to be of any possible service to customers in the way of advice or information concerning the lines of goods handled by them.



A SECTION OF OUR HOUSE FURNISHING GOODS DEPARTMENT.

"RING US UP" "SEND US A POSTAL"
OR BETTER STILL
"HONOR US WITH A VISIT"

Our Lady Patrons will find our House Furnishing Goods Section well stocked with

ENAMELED WARE,
STOVES, RANGES, PIPE, ETC.
TIN AND WOODEN WARE,
BROOMS AND BRUSHES,
ROCHESTER NICKELLED COPPER WARE,
CARPET SWEEPERS,
STONE AND EARTHEN WARE,
TABLE CUTLERY,
CLOTHES LINE, SHOE AND STOVE POLISH, POTASH,
CHLORATE OF LIME, WINDOW AND DOOR SCREENS.

"SNYDER OF FLATBUSH"

The pamphlet contains 40 pages, one of which is reproduced herewith, reduced about one-half in size. Several other illustrations are given of sections of the establishment, and one of the store front. The "tips," from which the pamphlet derives its name, occupy about 10 pages and cover Paint and Painting, Varnish and Varnishing, Floor Staining and Waxing, Enameling and Bronzing, Paint Brushes, Paper Hanging and a mass of miscellaneous information and pointers of general interest.

ORDERLINESS AND CLEANLINESS.

From a New England House: We have come to the conclusion that there are two things that are essential in the sale of Hardware—ORDERLINESS AND CLEANLINESS.

Stock must be in a presentable condition, and the clerks must know exactly where the different articles are. A clean, orderly old store is preferable to a hit or miss new one.

Displays nowadays cut a very large figure in the sale of Hardware. Coat Hangers, Window Screens, Clothes Wringers in the storeroom are slow movers, while the same goods well displayed with attractive price cards, show sales that are gratifying. Hardwaremen should turn their attention

Sell Profit-making Goods to the sale of goods for which there is an everyday call and on which the margin of profit is good.

We believe that it is necessary to change store displays at least once a week. This is very important. Make people think they can find everything in your store and they will surely come for the things you keep. A good method for the display of Hardware is the use of skeleton steps just fitting the top of a counter. Le Page's Glue, Putz Cream, small cans of Paint, Furniture Polish make a fine showing. Keep the dust off, change often, and don't forget the display cards. Folding shelves through the center of the store are desirable, and make a place for Shoe Brushes, Whisk Brooms, Coffee Mills, Cherry Stoners, &c.

Advertise the goods you are displaying, and don't fail to put in prices. Your competitors are only two or three—your customers are hundreds.

Keep your showcases in order. The best **Show-cases** \$500 investment we ever made was in these silent salesmen, but the glass must be clean and the goods well arranged. Nickel plated Bathroom Fixtures in a full display showcase is one of the best lines for the up to date Hardware store to handle.

Enough cannot be said about store windows. Do not be afraid to use water on the outside and your best skill on the inside, and above and beyond all, the fellow who has the best sales is the one who puts the price card on the goods. Put good men in charge of showcases and show windows. Don't leave them to the boys. When they get up an attractive window, let them know of your approval. They will do it better next time. The knowledge that it has pleased you is like an "oasis in a desert" to them. Encourage the clerk to try to do his best for you. He will sell more goods, treat your customers with more consideration, and be on the lookout for your interest, because of the knowledge that you are putting responsibility on his shoulders and approve of his action.

THE SPENCER WIRE COMPANY, Worcester, Mass., has established a department for the manufacture of Music Wire, Tempered Steel Card Wire and all kinds of similar high grade Wires which the company has never before attempted to make. The department will occupy a new building already completed, 50 x 125 feet and three stories. It contains an oil plant for tempering, installed by Gilbert & Barker, Springfield, Mass. Charles Johnson, who has had 20 years' experience with these classes of Wire, has been engaged to take charge of the department.

The plant of the Housatonic Mfg. Company, New Haven, Conn., will be occupied by a new corporation, which will manufacture Automobile Fittings and lines previously manufactured by the Housatonic Company. A certificate of incorporation has been filed in Connecticut by the Burns Mfg. Company, with authorized capital stock of \$500,000. The incorporators are William W. S. Burns, Samuel C. Morehouse and Aaron A. Ailing, the two latter being New Haven lawyers.

PALACE HARDWARE COMPANY'S STORE.

A PARTICULARLY attractive and well arranged store is that of the Palace Hardware Company, San Francisco, the secretary and manager of which is O. F. Sites, who is well known to the Hardware trade of the coast

&c. The contents of each box is designated by a sample conspicuously displayed on the outside. Underneath these boxes are drawers of larger size and bins for containing and storing larger tools, including Saws, Augers, Trowels, &c. On the same side of store is kept the retail stock of Screws, Cabinet Locks, Padlocks, &c. On the right hand

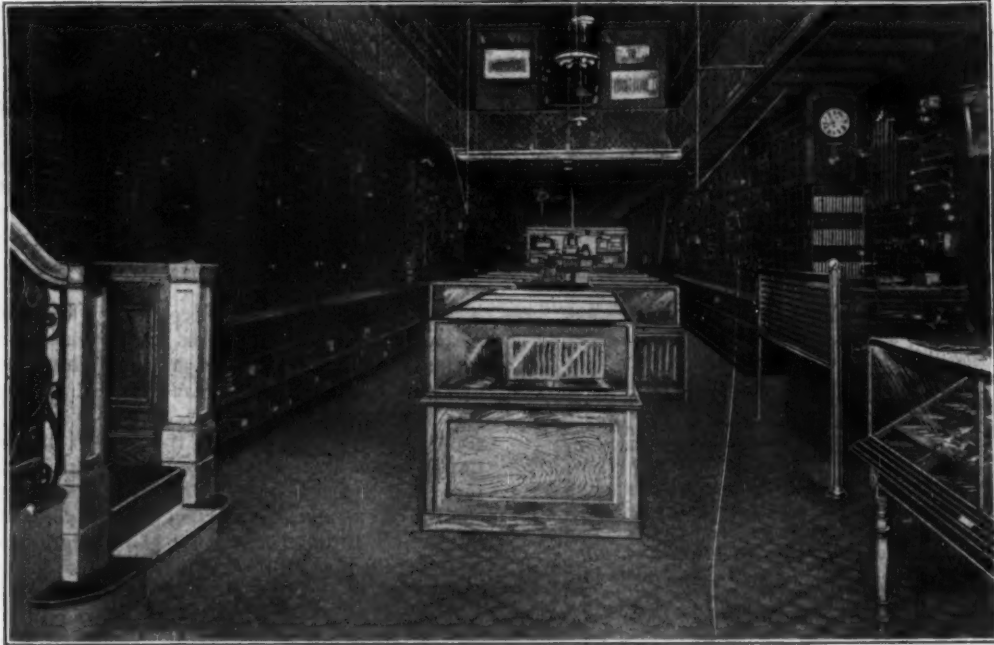


Fig. 1.—Palace Hardware Company's Store, with Galleries.

as the efficient president of the California State Retail Hardware Association. The storeroom, Fig. 1, is not very large, the floor measurement being 25 x 100 feet, but the ceiling is unusually high, so that galleries are permitted, which materially increases the capacity of the establishment. Only Tools, Cutlery, Flat Ware, bathroom

side of the store are Cabinet Trimmings and the retail stock of builders' supplies, arranged alphabetically from Adjusters to Turns.

In the left gallery, arranged in similar manner, is carried reserve stock of Door Bolts, Bright Wire Goods, Coat and Hat Hooks, Harness Hooks, &c. In the right



Fig. 2.—The Art Room.

supplies and shelf goods are handled on the main floor, rough Hardware, Nails, Sash Weights, &c., being carried in the basements.

On the left of the store, as one enters, underneath the gallery, and running back about 50 feet, are a series of shelf boxes, which contain the thousand and one small articles which are frequently called for, such as Bits, Gimlets, Files, Tapes, Pliers, Snips, Screwdrivers, Hooks,

gallery, arranged numerically, reserve stock of Locks and Bronze Goods is found. Tool stocks are kept in the center gallery. No broken packages whatever are kept in the galleries or in basements. Cutlery and kindred goods are handled through the medium of the display cases to the right and in the center of store. Aside from glass cases, the company has always found swinging boards to be the best form of sampling some classes of

goods. Articles always show up well on them, and they add very much to the appearance of the store, provided, of course, taste is used in arranging the samples, and if there is harmony in the color and finish of the goods and the board on which they are displayed.

The floor of the store is covered with heavy linoleum, such as is used on steamer decks and in many public places. This is referred to as wearing for years, always looking well, and as much easier to keep clean than a wood floor.

What is probably the chief feature of this establishment is the beautiful art room, a view of which is presented in Fig. 2. This apartment is on the mezzanine floor, and is reached by a staircase near the front of the store, as indicated in Fig. 1. This room was designed by a prominent San Francisco architect. All the wood-work is white cedar, finished in natural wood, waxed. The floor is of polished hard wood. The front consists of one large frame of Luxfer prisms, with an ornamental border of bevel plate glass, and the rear, overlooking the store, is of one very large plate of glass. The furnishings of the room are of the old Dutch school of weathered oak. The arrangements for handling samples of Builders' Hardware are patterned after those in use in the sample rooms of P. & F. Corbin in New York City. All mounted samples are kept in cabinets according to schools, where they are easily accessible when wanted.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

QUEEN ANNE SCREEN COMPANY, Burlington, Vt.: Fancy and Plain Screen Doors, Adjustable Window Screens, Inside Sliding Blinds, &c., are illustrated in a 1905 catalogue.

THE STANDARD HARROW COMPANY, Utica, N. Y.: Catalogue F, devoted to the Standard line of Harrows, Cultivating Implements, Manure Spreaders, Potato Harvesters, &c.

AMERICAN WINDOW SCREEN COMPANY, 404 Pennsylvania Building, Philadelphia, Pa.: Illustrated price-list relating to the American Adjustable Sliding Screens, which will fit any window. These are referred to as high grade Screens and are offered in stock sizes.

NATIONAL SEWING MACHINE COMPANY, Belvidere, Ill.: Illustrated pamphlets relating to Redgeton Sewing Machines.

THE AMBLER SAW MFG. COMPANY, Natick, Mass.: An illustrated pamphlet relates to Band Saw Set, Brazing Lamp and Forge, Circular Saw Set, Band Saw Filing Machines, Brazing Brass, &c.

THE ALUMINUM COOKING UTENSIL COMPANY, Pittsburgh, Pa.: Illustrated catalogue devoted to Aluminum Cooking Utensils, including Steamers, Kettles, Sauce Pans, Tea and Coffee Pots, Pudding and Cake Pans, Tea Kettles, Preserving Kettles, Measures, Cups, Dippers, Dinner Pails, Chafing Dishes, Trays, &c.

PHILADELPHIA SCREEN MFG. COMPANY, Fifty-sixth street and Woodland avenue, Philadelphia, Pa.: Catalogue showing styles of Screen Doors, Window Screens and Window Screen Frames for the season of 1905.

THE I. X. L. & GOSHEN PUMP COMPANY, Goshen, Ind.: Illustrated catalogues devoted to Screen Doors, Window Screens, Wood and Chain Pumps, Kitchen Cabinets, Cupboards, Tables and Sinks, Safes, Wardrobes, &c.

PORTER SCREEN MFG. COMPANY, Burlington, Vt.: Illustrated catalogue relating to High Grade Screen Doors, both plain and fancy, Adjustable Sliding Window Screens and Window Screen Frames. Landscaping in colors, true to nature, is done by the company; one number of Doors and another of Windows, landscaped, are carried in stock.

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HARDWARE STORE WINDOW DISPLAY.

BY J. A. KRAKAUER.

ONE might describe to a child over and over again what a horse looks like, but not until it has seen one will it have any well conceived idea of what a horse is. Men and women are merely children in the "Kindergarten of God." All must have object lessons in that which is new to them. All know what a Nail or a Screw is, and what they are used for—for all have seen them, and seen them used.

Most, for example, know what a Sprinkler is, but as the old toper said, "All whiskey is good, but some is better than others," so some Sprinklers are better than others. If a merchant has bought a line of Sprinklers which he considers better than others—and your own by the peculiar workings of human nature is always best—he might advertise the fact, tell of what it will do; but only a limited number of people will read this description, and still some of them will not understand the superiority of the article. Some may be interested enough to step into the merchant's store and receive an object lesson, but the majority, no matter how forcible or well worded the advertisement may be, will read, and that ends it. Others will not read at all, nor see.

How is this merchant to reach the vast multitude who will not read, not see, and consequently will not buy? It is reasonable to suppose that if the merchant has a good location, thousands of different people will pass his store within a week or two weeks. Then, why not put a display of these Sprinklers in a clean, well lighted (by all means have good light, at night especially, to catch the "folks out walking") show window. True, but "the putting," there's the rub.

Old Time and Modern Displays.

If the old time "hole in the wall" Hardware merchant were going to display Sprinklers, he would no doubt pile a few haphazard in a dirty, dingy window, or perhaps pile them up in the original boxes, and no doubt forget to take even one out, expecting people to see through pasteboard.

The modern method, I take it, would be something on this order: A window with a layer of dirt, some quick sprouting Seed sown in it. When it shows green a scene tastefully arranged, comprising Lawn Mowers, Lawn Chairs, Scythes, Grass Shears, &c. Then a nice piled semicircle of Sprinklers for a background. Goods piled or on boards serve best as backgrounds; or, better yet—and it has been tried—cover the bottom of the window with tin, secure drainage, some potted plants, foliage, &c., tap the nearest Water Pipe, put in a Cock, run a piece of Hose to the Sprinkler in the middle of the window, give it enough pressure to show its workings and still not hit the sides. An attractive window can say, "I came, 'they' saw, I conquered."

The Use of the Windows.

And how should a merchant best marshal his forces in window display to conquer? If he has two or three windows, utilize one or two for a display of goods, changing them frequently. The other window should be used for ingenious displays of one kind or the other. The value of such displays cannot be overestimated. In the first place, they attract people to stop and look at the windows, and from admiring the clever they will pass to the examination of the useful. Secondly, in small Western towns where distances are great a skillful display serves as an advertisement for the visiting country people, who will remember some well conceived display long after it ceases to exist, and in connection therewith will remember the merchant who had it, and recall his name when in need of anything.

Get Talked About.

Advertising, after all, is the alpha and omega of all success in modern business. The best form of advertising for a politician, a merchant, a store or a city, is to get himself, or itself, talked about; and there is hardly a better medium to create talk about a store than a clever window display.

To illustrate: There was held in our town a mid-winter carnival, and, realizing the great advertisement

show windows are, we devoted time and care in arranging our four windows. In one we had a display of Paints and Brushes showing our full line. The bottom was covered with small compartments made of wood filled with different hued Dry Colors, making a very pretty effect. A large middle window was divided by a drapery of American Colors into two divisions. In the one we put a battle ship, such as was once shown in *The Iron Age*, only fitted up on a more elaborate scale, having in the distance a lighthouse made of remnants of Belting, surmounted by a Conductor's Lantern, in which was placed an electric light. In fact, electrical effects were quite a feature—one light served as a search light, another, red in color, was concealed in the funnels, so at night the effect of the ship under steam was perfect.

Moving Displays.

In the other division we had a Ferris wheel, made of Carriage Rims, bolted together. Screw Drivers, Auger Bits, Hack Saws, &c., served as Spokes. All were mounted on a stand covered with Bells, &c. The motive power was obtained by dismantling an Electric Fan, connecting it by Pulleys and Belt to the wheel. The cars were made of Tin, suspended by Jack Chain, filled with small articles of Hardware. Around the base were Tools tastefully arranged, and a sign reading:

"ONE GOOD TURN DESERVES ANOTHER; VALUE FOR VALUE IS OUR MOTTO."

The wheel was covered with electric lights, which at night as they revolved made a glorious and stunning effect.

In the third window we had a small electric skeleton performing on a miniature stage. This contrivance was run by Batteries. In fact, to call in the aid of an electrician will prove profitable and novel at all times. Banked on tiers below the "theater" were specialties of all kinds, Carving Sets, Knives, &c.

Results.

The effect of these displays, especially at night, was marvelous. Crowds surrounded them. They were one of the attractions of the festival. On all sides were heard:

"Have you seen ———'s windows?"

"Did we sell any goods directly through them?"

"Perhaps, perhaps not."

"Were we advertised?"

"Yes."

"Does being advertised eventually sell goods?"

"Yes."

"Then does a tasty or clever window display on any and all occasions pay?"

"Yes!"

! Came to See the Display.

Not long ago a man walked into the store, and, on being asked what he wanted, said: "Nothing." He was a stranger "looking around," but in reality had come by to see our show windows. Being from Louisiana, some one on the train in East Texas had spoken of our carnival windows, and told the gentleman, by all means, if coming the way, to see our displays, which had by this time been changed.

"Did the man who remembered and spoke of the windows buy anything?"

"Not sure."

"Did the man who came to see them buy anything?"

"No."

"Did they both advertise us?"

"Yes."

"And the town?"

"Yes."

So having a clean, well stocked store, clever, skillful and tasty show windows not only helps the store, but helps the town. That which helps the town helps the merchant. A reputation for fine stores is the best a town can enjoy, so get your stores talked about, remembered, and I have no hesitancy in saying the show window will do it if anything can. Follow up your displays with clear pithy, forcible newspaper locals and space advertising, and you will have a "combination of locals" that even discriminating rates on the railroads cannot beat.

SAFETY OF CARTRIDGES AND LOADED SHOTGUN SHELLS.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn., has just issued an interesting booklet entitled "Tests Showing the Safety of Cartridges and Loaded Shotgun Shells When Subjected to Careless Handling, Falls, Shock and Fire." The company was prompted to issue this booklet in view of the commonly existing misconception on the part of the transportation and fire insurance people as well as firemen as to the safety in handling and stocking Cartridges and loaded Shotgun Shells. The company has found that where handling and stocking Cartridges and Shotgun Shells is deemed dangerous the belief is due to classing Cartridges and loaded Shotgun Shells with bulk powder and other high explosives. This is an entire misconception of the properties and characteristics of the goods. In the introduction to the booklet attention is called to the difference between Cartridges and loaded Shotgun Shells and high explosives in bulk, and by tests which are described the company proves the truth of its contention.

Since preparing the booklet the company states that it has gone more fully into the subject of the action of Cartridges and loaded Shotgun Shells when subjected to fire, and has compiled statistics which satisfy it that this class of goods is much less combustible than many other lines carried in the ordinary Hardware dealer's store. The company wrote 1322 dealers in metallic Cartridges and loaded Shotgun Shells asking them whether or not in their experience they had had any fires due to the explosion of metallic Cartridges or loaded paper Shot Shells while in storage, and if they had had fires from this or any other cause to state whether or not the fact that ammunition was in stock interfered with the firemen in controlling the flames. As a result of the correspondence the company found that none of the parties written to had suffered from fires caused by the explosion of ammunition. One hundred and ninety-one dealers replied that they had suffered from fires, but that the presence of ammunition in the buildings interfered in no way with the work of the firemen. Thirty-nine dealers that they had had actual experience with fire, but made no reference to firemen. Seven who had fires stated that the firemen were somewhat afraid to approach the buildings on account of the fact that bulk powder and ammunition were stored in them. The remainder of the dealers written to had never had fires and expressed the opinion that metallic Cartridges and loaded Shotgun Shells were not as combustible a stock as many other lines of goods which they regularly carried.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses and are referred to the manufacturers:

FROM HYDE & FAICHNEY, Massena, N. Y., successors to J. L. Hyde & Son in the Shelf and Heavy Hardware business.

FROM MCGREGOR & CAMPBELL, Chesaw, Wash., who are enlarging their premises to make room for a large stock of Shelf Hardware, Agricultural and Miners' Supplies, Guns and Ammunition, &c.

FROM J. B. MALLORY & SONS, Uniontown, Ky., who have lately entered the Shelf and Heavy Hardware, Stove, Tinware and Sporting Goods business.

FROM THOS. ELLIS, Columbia, S. C., who is making arrangements to embark in the wholesale and retail Hardware business at that place in the near future. Mr. Ellis is well and favorably known to the Southern trade, having traveled that territory in the interest of

prominent Eastern houses, manufacturing and jobbing, for the past 27 years. He is now fitting up the establishment for the reception of goods and will soon take up the purchase of stock.

FROM S. B. HICKS & SON COMPANY, Seattle, Wash., which has increased its capital stock to \$100,000. The company will move into new quarters February 1 next, where it will have much improved facilities for the conduct of its wholesale Heavy Hardware business.

FROM RICE & BARNES, Lovilia, Iowa, who are successors to John Rice & Co., in the Hardware, Stove and Implement business.

FROM SHELBY SUPPLY COMPANY, Shelby, Ohio, which has succeeded O. W. Jones in the Hardware, Stove and Implement business.

FROM S. G. SLACK & Co., Tifton, Ga., whose establishment was recently destroyed by fire.

FROM H. A. BRETZKE, Blue Earth, Minn., who has lately opened a new store, handling Shelf and Heavy Hardware, Stoves and Tinware, Paints and Oils, Sporting Goods, &c.

FROM GEO. T. SELLERS, Gap, Lancaster Co., Pa., whose Hardware, Stove, Implement and Plumbing establishment was burned out on the 18th ult.

FROM F. E. LUMPKIN, Bellaire, Kan., who is successor to Rice & Kitterman in the Hardware, Stove, Implement, Paint and Sporting Goods business.

FROM R. N. COX, Steinauer, Neb., who has lately commenced business in Shelf and Heavy Hardware, Stoves, Implements, Paints, Sporting Goods, &c.

FROM T. A. LEE, Collinsville, Ind. Ter., successor to Lee & Bentley in the Hardware, Stove, Paint and Sporting Goods business.

FROM M. BARDE & SON, Portland, Ore., who have succeeded Barde & Gregory in Iron, Steel and Metals, wholesale and retail.

FROM M. F. RICHEY, Thornton, Ind., successor to J. E. Leatherman in the Hardware, Implement and Stove business.

FROM O. C. SLANE, Peoria, Ill., dealer in general Hardware, who desires especially catalogues and price-lists relating to Guns and Sporting Goods.

FROM HAYMI BROS., Manassa, Col., who have succeeded R. M. Haymi in Hardware, Stoves, Agricultural Implements, Sporting Goods, Wagons, Buggies, Harness, Furniture, &c. The firm is building a new store, 27 x 124 feet.

FROM A. L. ARMSTRONG, Bethany, Ill., who will embark in the Hardware, Stove and furniture business about December 10.

FROM STARK & WECKESSER, Dayton, Ohio, who are contemplating the addition of Shelf Hardware to their Cutlery, Bicycle, Gun and Sporting Goods business.

FROM UPSHUR HARDWARE COMPANY, Buckhannon, W. Va., which has lately commenced business in Shelf and Heavy Hardware, Stoves, Agricultural Implements, Paints, Sporting Goods, &c.

FROM THE RUSSELL-MONTAGUE HARDWARE COMPANY, Wills Point, Texas, who will commence business December 1, with a capital stock of \$10,000.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., LONDON, W. C., November 26, 1904.

The Week's Hardware Trade.

THE steady improvement to which allusion has been made in previous weeks, so far as the lighter trades are concerned, has probably reached its limit to the end of the year at least. There is a good demand for fancy goods, but, for the rest, orders are only average. The building trade has become slack owing to the severe weather, and this somewhat retards the builders' ironmongery department, although, as a general rule, builders may be sufficiently advanced by now to get on with indoor work.

The outstanding feature of the trade at the moment is a cutting in prices of Cycles. A good Cycle can now be obtained in this country for \$30. I suppose this will go on for a little while, until stocks have been cleared out, and then Cycle makers will come to their senses. There can be no doubt that the trade is undergoing a crisis, and it is not easy to foretell the immediate outcome. One hears of reconstruction of various Cycle companies, but there is no definite news.

On overseas account there is increased buying from several markets, particularly Hoes and Plantation Tools. West Indian trade is well maintained, the principal business being in Shelf Goods and General Hardware. More animation is observable in Australia and New Zealand, and South African dealers have this week sent larger indents than for some time previously. The European market is quiet, but a good volume of merchandise is being shipped to India and other Eastern markets.

Ironmongers and Direct Trading.

Following the instructions given at a recent meeting of the Birmingham and District Ironmongers' Association, the Advisory Committee have drawn up a circular to be sent to manufacturers who are in the habit of carrying on direct trading. They state in the circular they have had printed that the members of the association have lately given much thought to the question of direct trading, which is proving so great an evil in this district that it seriously menaces the stability of the ironmongery trade. They felt that in the past they had allowed this evil to grow into a custom without united protest on their part, and manufacturers had therefore grown up in the belief that they were fully justified in retailing their wares in the city of their production. Being fully alive to the evil, in conjunction with federated ironmongers throughout the country, the committee now make a united protest, and appealing to the sense of fairness of manufacturers ask them to help in the effort to suppress direct trading, the abolition of which, it is stated, must mean increased prosperity to the loyal manufacturer. The committee have, therefore, decided:

That wherever practicable preference will be given in buying to those manufacturers who are willing to dispose of their goods through retail trade channels. We ask manufacturers to refer applications from consumers or retail buyers to the nearest ironmonger, and to advise the ironmonger so that he may solicit the order if necessary. And we are also determined that business passed to the retailer shall be transacted with the manufacturer in question, and that goods of any other manufacturer shall not be substituted. Should manufacturers have cause for complaint in this respect, the committee will be glad to be informed.

ILLINOIS RETAIL HARDWARE DEALERS' ASSOCIATION.

IT is announced that the annual meeting of the Illinois Retail Hardware Dealers' Association will be held at Peoria, Ill., on Tuesday, Wednesday and Thursday, February 14, 15 and 16 next.

W. A. CAMPBELL has severed his connection with Wadsworth-Howland Company, Chicago, and is now representing the Buffalo Oil, Paint & Varnish Company, Buffalo, N. Y. He will open an office and warehouse in Chicago, and will have under his care the general jobbing trade.

S. R. SLAYMAKER.

S. R. SLAYMAKER, Lancaster, Pa., has bought the entire business, machinery, patterns, tools, contracts, records, &c., of the Thomas Slight Lock & Mfg. Company, Newark, N. J., said to be the oldest manufacturer of "Made to Order" Padlocks in the United States, and who made a line of the highest grade of "Made to Order" Padlocks for the Government, railroads and other large corporations. This line has been removed to Lancaster and will be manufactured by Mr. Slaymaker in a department which will be devoted exclusively to the manufacture of the Slight "Made to Order" Locks. The department will be under the supervision of the former superintendent of the Slight plant, so as to continue in every particular the excellent grade of goods made by the Slight Company. These goods, added to the line of "Made to Order" Padlocks already produced by Mr. Slaymaker, and to the line of Padlocks made for the general trade, enables him to offer an exceptionally large and effective line of Padlocks for all purposes. The Slight Company also made Coach Locks and Car Hardware generally. The manufacture of these goods also will be continued by Mr. Slaymaker, and there will be practically no interruption to the supply of Slight goods, orders for which should in future be sent to Lancaster, Pa. John H. Graham & Co., 113 Chambers street, are New York and export sales agents.

MISCELLANEOUS NOTES.

Acme Ball Bearing Casters.

The Smith & Hemenway Company, 296 Broadway, New York, manufacturer of the Acme ball bearing casters, has improved the form of its product by the substitution of a solid rim instead of fingers and claws, as formerly, to hold the balls in the shell. The solid rim is slightly above the center of the ball and is beveled so as to maintain the balls in their proper position in the shell, thus obviating any chance of balls dropping from their normal place.

A Mechanics' Soap.

The Ulika Soap Company, Southington, Conn., is manufacturing the Ulika hand and household soap. It is intended for mechanics, compositors, pressmen and others and is guaranteed by the manufacturers to remove stains of various kinds, iron rust, ink or paint, leaving the hands clean and soft. It is described by the company as an antiseptic, nonacid, pure vegetable compound, quick in action. It is also recommended as a good household cleanser which can be used, if necessary, for scouring pots, pans, &c.

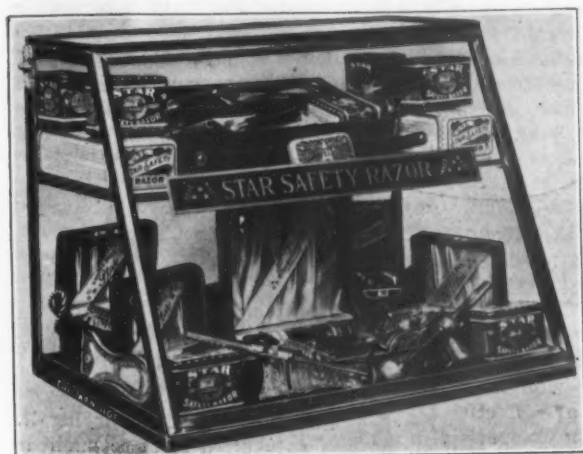
Metal Window Screen.

Watson Mfg. Company, Jamestown, N. Y., has recently been allowed a patent on a metal window screen which is constructed entirely of bronze metal, including wire cloth. It is light and stiff, having the wire tightly stretched, inconspicuous lifts, attachable springs and other novel features. The screen will be furnished in all colors of baked japan, also finished in various metals, including oxidized finishes.

Showcase Display, Assortment A.

The case shown in the accompanying cut is 14 inches long, 10 inches deep and 10 $\frac{1}{4}$ inches high at the back, and is filled with the following assortment of Star Safety Razors and supplies, made by Kampfe Bros., 8-12 Reade street, New York: Six No. 1 Star Safety Razors, complete; three No. 2 Star Safety Razor Blades; two No. 3 Stropping Machines; two No. 25 Star Stropers; two No. 26B Diagonal Strops; one No. 4 Jewel Case, one Blade; one No. 5 Star Case, two Blades; one No. 6 Star Case, three Blades; one No. 7 Star Case, four Blades;

one No. 9 Traveling Case, two Blades; one No. 24 Combination Outfit. The case is furnished free when the foregoing assortment is purchased. The case provides a



Showcase Display, Assortment A.

convenient and desirable method of making an effective display of a judiciously selected assortment of these goods.

Stamped Steel Sash Lock and Cupboard Catch.

The Shelby Spring Hinge Company, Shelby, Ohio, is offering the stamped sash lock and cupboard catch shown herewith. The lock, Fig. 1, is made of heavy stamped

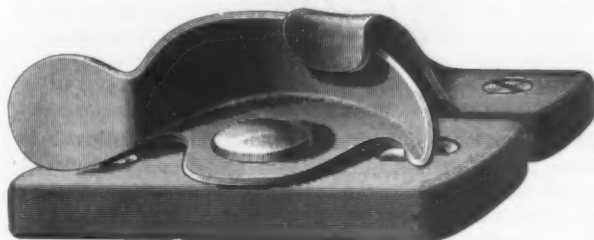


Fig. 1.—Stamped Steel Sash Lock.

steel. It is explained that it cannot be opened from the outside, and is thus burglar proof. The locks are packed one dozen in a box, two gross in a case, and are furnished in all the regular hardware finishes. The cupboard catch, Fig. 2, is made of stamped steel, in three lengths, 1, 1½ and 2 inches. The manufacturer has taken particular pains to have the catch as neat in appearance as possible and

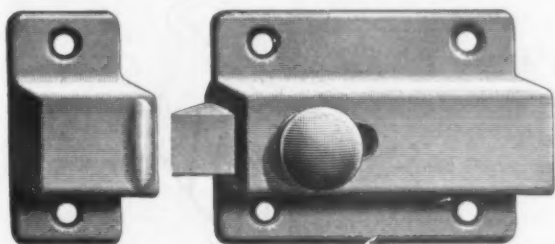


Fig. 2.—Stamped Steel Cupboard Catch.

to work with the least amount of friction. The knob is made from turned steel with polished head. The catches are packed two dozen, with screws, in a box, and are furnished in all the hardware finishes.

The Japanese Wheelbarrow.

The tray of the wheelbarrow shown in the accompanying cut is round in form, having beveled tongue and grooved staves held firmly together by round hoops which

are sunk into grooves which are cut in the staves diagonally to prevent the hoops getting out of place. The hoops are also provided with compression springs at their ends, which makes an elastic hoop, connected so that when the tray is made the spring is compressed. The springs act automatically, and their purpose is the overcoming of any shrinkage or expansion that may occur after the tray is made. This style of barrow car-



The Japanese Wheelbarrow.

ries the load in more compact form near the wheel with less weight at the handles, and admits of the contents being dumped either at the front or sides. The tray is made of selected hard wood, and has the same capacity as the company's "Queen B." The frame is also the same as the "Queen B," and is equipped with either No. 0 or Hubbard 16-inch wheel. The barrow is offered by Puffer-Hubbard Mfg Company, Minneapolis, Minn. The company states that it is very strong and neat in appearance, and that while it may appear odd at first, it will be found to more than meet the requirements of an ordinary barrow.

Bell Coffee Mill.

The Arcade Mfg. Company, Freeport, Ill., is placing on the market a new coffee mill, shown herewith. The mill has a glass front in the hopper, permitting the operator to see at a glance the quantity of coffee in the hopper. It has also an adjustable glass receiving cup,

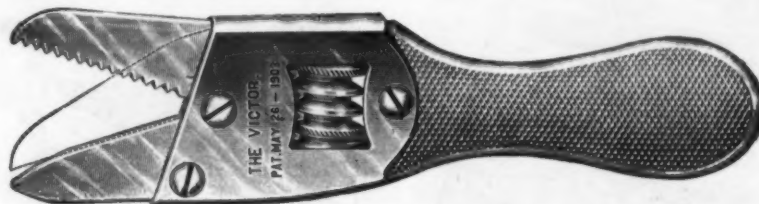


Bell Coffee Mill.

the adjustment consisting of a spiral spring that will permit the use of a glass of any height and hold it firmly against the metal top. Another feature of the mill is adjustable high speed grinders. The mill is attractive in appearance, the wood work having antique oak finish and the metal either Arcadian bronze or oxidized copper.

The Victor Adjustable Alligator Wrench.

Acme Hardware Company, Newark, N. J., is offering the adjustable alligator wrench shown herewith. It is made of best tool steel, hardened and tempered, and is alluded to as combining strength, simplicity and rapidity of adjustment. There are no springs used in construction, all parts are visible, and the tool is guaranteed by the maker. The adjustment permits use on a nut from

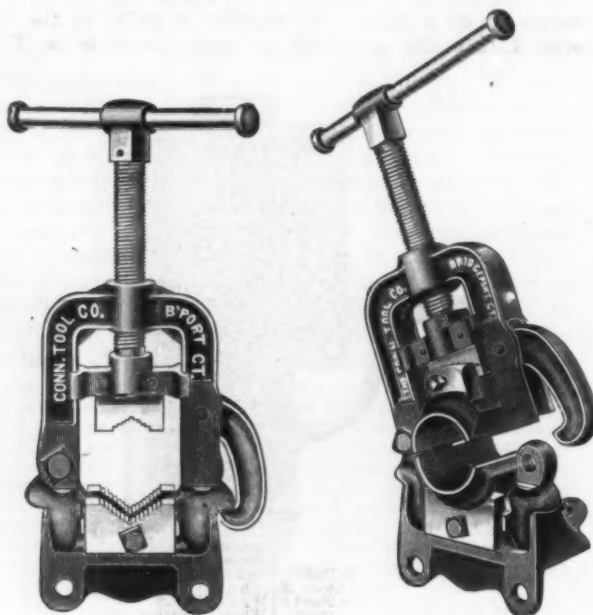


The Victor Adjustable Alligator Wrench.

3-16 up to $\frac{3}{4}$ inch one minute, and on a pipe the next minute. The wrench is designed as a high grade tool for use by plumbers, gas and steam fitters, wagon smiths and mechanics generally. The wrench is furnished in 7, 8 and 10 inch sizes, full nickel plated. Beginning with the season of 1905 the company expects to be in position to furnish the wrench in black finish in addition to nickel plated, the black finished goods being designed for household articles. We are advised that the price of the black finished goods will be very moderate.

Reversible Hinged Pipe Vise.

The hinged pipe vise shown in the accompanying illustrations contains the important feature of being reversible so that it will open either at the right or left side, which is accomplished by reversing the top. When in use the jaws, which are self locking, are held in place by means of a latch, following the modern practice of



Reversible Feature.

Brass or Nickel Pipe Jaws.

Reversible Hinged Pipe Vise.

this type of tool. The vise is made of malleable iron, with jaws of crucible steel, milled and tempered, which can be resharpened. The screws are made of machinery steel. The tool is made in two sizes: 1A, taking pipe $\frac{1}{8}$ to $1\frac{1}{2}$ inches; 2A, from $\frac{1}{2}$ to $4\frac{1}{2}$ inches. The 1A vise may be quickly fitted with jaws for holding brass or nickel pipe from $\frac{5}{8}$ to 2 inches in diameter, as shown in the cut to the right, and these jaws will not mar the pipe. The manufacturer of the vise is the Connecticut Tool Company, Bridgeport, Conn.

The Hayden Cleaning Appliances.

Hayden Implement Company, 46 Duane street, New York, is offering the modern cleaning appliances shown herewith. In Fig. 1 is illustrated the Hayden reversible reservoir scrubber. The frame that holds the brush acts as a reservoir and takes a considerable quantity of water from a pail. The rubber, or squilgee, as it is termed, on the front of the brush, is for driving the

dirty water off the floor and thus assists in drying it. The frame is made of best galvanized steel to make it durable. The handle is firmly secured so as not to come out. On account of the brush being reversible it will wear more evenly and longer than a nonreversible brush,



Fig. 1.—The Hayden Reversible Reservoir Scrubber.

and the parts are quickly interchangeable. The brush is referred to as of best quality, extra long and guaranteed not to mat. An operator, it is pointed out, can scrub quickly and with less labor on account of the light weight of the device. The brush is sold with or without the squilgee attachment. The device is designed for use by hotels, hospitals, offices and public buildings, fire departments, railroad and steamship lines, stables, *cafés*, &c.

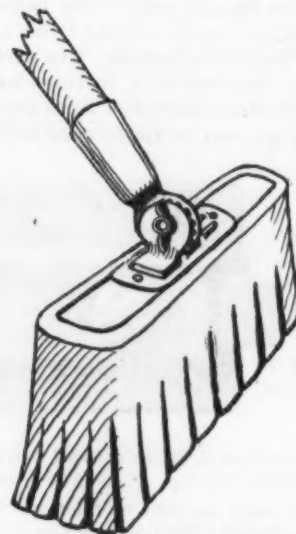


Fig. 2.—The Hayden Felt Broom and Duster Combined.

The Hayden felt broom and duster combined is shown in Fig. 2, the adjustable handle of which allows it to be placed at any angle. The handle can be detached and the broom part used for dusting furniture, pianos, &c. The manufacturer states that the broom does not dislodge dust or germs, to settle elsewhere, but takes them up and

holds them until shaken out; also that it takes the place of unsanitary feather dusters, rags, &c. The broom may be used for sweeping polished, stained or painted floor margins, for cleaning walls, ceilings and cornices.

The Myers Sure Grip Sling Unloader.

The accompanying cuts represent a sling unloader put on the market by F. E. Myers & Bro., Ashland, Ohio. The machine has an extra long truck, with malleable

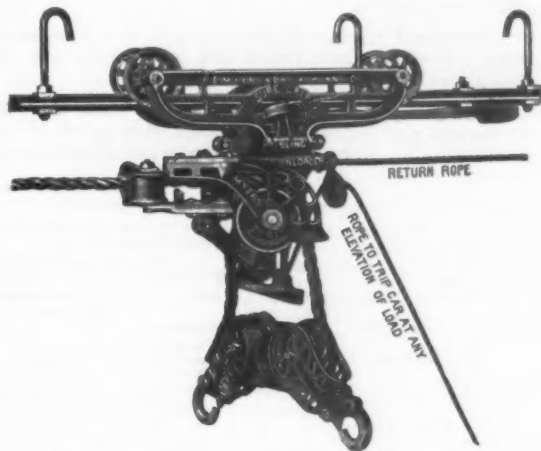


Fig. 1.—The Myers Sure Grip Sling Unloader.

pulleys that come down to the wagon. In Fig. 1 the machine is shown as a simple hoist, and in Fig. 2 with a triple hoist attachment. The machine has a swivel reversible sling carrier, which elevates the bundle at right angles with the track, so that when the load is discharged in the mow it lies parallel with the load on the wagon. This is referred to as an important advantage, as it obviates giving the load a quarter turn. The unloader is designed to meet every requirement for use in unloading hay and grain with one or two hay forks, with slings, and with simple or triple hoist, the operator being able to change from using slings to forks or the reverse in a moment. The machine is reversible, adapted to wood or steel track and for any size rope from $\frac{3}{4}$ to 1 inch without any changes. The unloader is constructed entirely of malleable iron, is heavy and of sufficient strength, it is explained, to withstand the hard usage to which such machines are sub-

jected. Slipping of the rope through the lock as a result of overloading a carrier has been overcome, as the machine is arranged so that the heavier the load the greater the tension of the rope lock. The unloader operates automatically, and is tripped by the sling pulleys striking a plate immediately under the machine. It is also arranged with a separate trip rope, by the use of which the



Fig. 2.—The Myers Sure Grip Sling Unloader for Double Steel Track.

load may be carried into the mow at any elevation desired without going entirely to the top of the barn. The triple hoist arrangement, Fig. 2, is accomplished by attaching a pulley to one side of the carrier, through which a rope is passed, and then attached to an eye in one of the sling pulleys, which is especially designed for that purpose.

PAINTS, OILS AND COLORS

White Lead, Zinc, &c.—

Lead, English white, in Oil..	9% @ 9%
Lead, American white, in Oil:	
Lots of 500 lb or over.....	@ 6%
Lots less than 500 lb.....	@ 7%
In Barrels.....	@ 6%
Lead, White, in oil, 25 lb tin	
pails, add to keg price.....	@ 1/2
Lead, White, in oil, 12 1/2 lb tin	
pails, add to keg price.....	@ 1
Lead, White, in oil, 1 to 5 lb	
ass'ted tins, add to keg price ..	@ 1 1/2
Lead, American, Terms: For lots 12	
tons and over 1/4% rebate; and 2% for	
cash if paid in 15 days from date of	
invoice; for lots of 500 lbs. and over	
2% for cash if paid in 15 days from	
date of invoice, for lots of less than	
500 lbs. net.....	@ 6
Lead, White, Dry in bbls.....	@ 6
Zinc, American, dry.....	4% @ 4%
Zi c. e. French:	
Paris, Red Seal, dry.....	8%
Paris, Green Seal, dry.....	9%
Antwerp, Red Seal, dry.....	7%
Antwerp, Green Seal, dry.....	8%
Zi c. V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over.....	11% @ 12%
Lots of less than 1 ton.....	12% @ 12%
Zi c. V. M. French, in Poppy Oil:	
R-1 Seal:	
Lots of 1 ton and over.....	10% @ 11 1/4
Lots of less than 1 ton.....	10 1/2% @ 11 1/4
Discounts—French Zinc—Discounts	
to buyers of 10 bbl. lots of one or mixed	
grades, 1%; 25 bbls., 2%; 50 bbls., 4%.	

Dry Colors—

Black, Carbon.....	5 @ 10
Black, Drop, Amer.....	4 @ 6
Black, Drop, Eng.....	4 @ 15
Black, Ivory.....	16 @ 20
Lamp, Com. Celestial.....	4 @ 6
Blue, Chinese.....	29 @ 32
Blue, Prussian.....	27 @ 30
Blue, Ultramarine.....	4 1/2 @ 15
Brown, Spanish.....	1 1/2 @ 1
Carmine, No. 40.....	33.50 @ 4.00
Green, Chrome, ordinary.....	3 1/2 @ 6

Green, Chrome, pure.....	17 @ 25
Lead, Red, bbls., 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 5 1/2
Lots less than 500 lb.....	@ 7
Litharge, bbls., 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/2
Lots less than 500 lb.....	@ 7
Ocher, American.....	10 @ 16.00
Orcher, American Golden.....	2 1/2 @ 3 1/4
Orcher, French.....	1 1/2 @ 2 1/4
Orcher, Foreign Golden.....	3 @ 4
Orange Mineral, English.....	8 1/2 @ 10 1/4
Orange Mineral, French.....	10 1/2 @ 11 1/4
Orange Mineral, German.....	7 @ 10
Orange Mineral, American.....	8 @ 8 1/4
Red, Indian, English.....	4 1/2 @ 5 1/4
Red, Indian, American.....	5 @ 5 1/4
Red, Turkey, English.....	4 @ 10
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	100 lb \$1.50 @ 1.75
Red Venetian, English.....	100 lb \$1.15 @ 1.75
Sienna, Italian, Burnt and	
Powdered.....	3 @ 9 1/2
Sienna, Ital., Raw, Powd.....	3 @ 6 1/2
Sienna, American, Raw.....	1 1/2 @ 2
Sienna, American, Burnt and	
Powdered.....	1 1/2 @ 2
Talc, French.....	10 ton \$30.00 @ 30.00
Talc, American.....	10 ton \$15.75 @ 25.00
Terra Alba, French.....	100 lb 90 @ 1.00
Terra Alba, English.....	100 lb 90 @ 1.00
Terra Alba, American.....	100 lb 100 @ 1.00
No. 1.....	1.00 @ 70
No. 2.....	2.45 @ 30
Umber, T'key, Bnt. & Pow.....	2 1/2 @ 3 1/4
Umber, Turkey, Raw & Pow.....	2 1/2 @ 3 1/4
Umber, Burnt, Amer.....	1 1/2 @ 2
Umber, Raw, Amer.....	1 1/2 @ 2
Yellow, Chrome.....	11 @ 14
Vermilion, American Lead.....	10 @ 25
Vermilion, Quicksilver, bulk.....	@ 65
Vermilion, Quicksilver, bags.....	@ 66
Vermilion, English, Import.....	75 @ 80
Vermilion, Chinese.....	\$0.90 @ 1.00

Colors in Oil—

Black, Lampblack.....	12 @ 14
Blue, Chinese.....	36 @ 46
Blue, Prussian.....	32 @ 36
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	11 @ 14

Green, Chrome.....	10 @ 15
Green, Paris.....	@ 24
Sienna, Raw.....	12 @ 15
Sienna, Burnt.....	12 @ 15
Umber, Raw.....	11 @ 14
Umber, Burnt.....	11 @ 14
Miscellaneous—	
Barytes, White, Foreign.....	
Barytes Amer. floated.....	10 ton \$17.50 @ 20.00
Barytes, Raw.....	10 ton 16.00 @ 17.00
Barytes Crude, No. 1.....	10 ton 10.00 @ 11.00
Chalk, in bulk.....	10 ton 3.00 @ 3.25
Chalk, in bbls.....	100 lb .35
China Clay, English.....	10 ton 11.00 @ 17.50
Cobalt, Oxide.....	100 lb 2.50 @ 3.00
Whiting, Common.....	100 lb .45 @ .48
Whiting, Gilders.....	100 lb .55 @ .57
Whiting, Extra Gilders.....	100 lb .50 @ .60

Putty—

In bladders.....	100 lb 1 1/2 @ 2
In bulk.....	100 lb 1.05 @ 1.15
In cans, 1 lb to 5 lb.....	100 lb 2 1/4 @ 4
In cans, 1 1/2 to 2 1/2 lb.....	100 lb 1 1/2 @ 2

Spirits Turpentine—

In Oil bbls.....	50 @ 61
In machine bbls.....	51 @ 61 1/2

Glue—

Cabinet.....	11 @ 15
Common Bone.....	6 @ 8
Extra White.....	18 @ 24
Foot Stock, White.....	11 @ 14
Foot Stock, Brown.....	7 @ 10
German Hides.....	12 @ 18
Irish.....	10 @ 10
Low Grade.....	3 @ 11
Medium White.....	14 @ 17

Gum Shellac—

Bleached Commercial.....	43 @ 44
Bone Dried.....	33 @ 54
Button.....	45 @ 60
Diamond L.....	50 @ 50
Fine Orange.....	32 @ 54
A. C. Garnet.....	45 @ 46
D. C.....	1.00 @ .
Octagon B.....	54 @ 55
T. N.....	49 @ 52

V. S. O.....

Animal, Fish and Vegetable Oils—

Linseed, City, raw.....	41 @ 42
Linseed, City, boiled.....	43 @ 44
Linseed, State and West'n, raw.....	40 @ 40
Linseed, raw Calcutta seed.....	55 @ 55
Lard, Prime, Winter.....	58 @ 59
Lard, Extra No. 1.....	48 @ 49
Lard, No. 2.....	36 @ 38
Cotton-seed, Crude, f.o.b. mills.....	19 @ 19 1/2
Cotton-seed, Summer Yellow,	
prime.....	24 1/2 @ 25
Cotton-seed, Summer Yellow,	
off grades.....	24 1/2 @ 26
Sperm, Crude.....	55 @ 56
Sperm, Natural Spring.....	53 @ 55
Sperm, Bleached Spring.....	57 @ 58
Sperm, Natural Winter.....	55 @ 56
Sperm, Bleached Winter.....	54 @ 55
Tallow, Prime.....	48 @ 50
Whale, Crude.....	@ .
Whale, Natural Winter.....	45 @ .
Whale, Bleached Winter.....	47 @ .
Menhaden, Brown, Strained.....	27 @ 28
Menhaden, Light, Strained.....	28 @ 29
Menhaden, Bleached Winter.....	30 @ 32
Menhaden, Ex-Bld. Winter.....	32 @ 33
Menhaden, Southern.....	19 1/2 @ 20
Cocanut, Ceylon.....	10 lb 7 1/2 @ 7 1/4
Cocanut, Cochinn.....	10 lb 7 1/2 @ 7 1/4
Cod, Domestic.....	34 @ 36
Cod, Newfoundland.....	32 @ 41
Red Elaine.....	30 @ 33
Red Saponified.....	10 lb 4 1/2 @ 5
Olive, Italian, bbls.....	52 @ 55
Neatsfoot, prime.....	50 @ 51
Palm, prime Logos.....	10 lb 5 1/2 @ 6

Mineral Oils—

Black 29 gravity 25 @ 30 cold	
test.....	10 gal. 11 @ 12
Black, 29 gravity, 15 cold test.....	12 @ 13
Black, Summer.....	11 @ 12
Cylinder, light filtered.....	18 1/2 @ 19 1/2
Cylinder, dark filtered.....	16 1/2 @ 17 1/2
Paraffine, 903-907 gravity.....	13 @ 13 1/2
Paraffine, 903 gravity.....	12 @ 12 1/2
Paraffine, 863 gravity.....	9 1/2 @ 10
Paraffine, red.....	12 @ 13 1/2
In small lots 1/2 c advance.	

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 $\frac{1}{2}$ @ 33 $\frac{1}{2}$ & 10% signifies

that the price of the goods in question ranges from 33 $\frac{1}{2}$ per cent. discount to 33 $\frac{1}{2}$ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33 $\frac{1}{2}$ %
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ lb. 7 $\frac{1}{2}$ ¢ @ 7 $\frac{1}{2}$ ¢
Hay-Budden, Wrought.....@ 9 $\frac{1}{2}$ ¢
Horseshoe brand, Wrought.....@ 9 $\frac{1}{2}$ ¢
Trenton..... $\frac{1}{2}$ lb. 9 $\frac{1}{2}$ ¢

Imported—

Peter Wright & Sons..... $\frac{1}{2}$ lb. 10%
Anvil, Vise and Drill—
Millers Falls Co., \$18.00.....15&10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Hull Bros. Co.....30&10%
Livingston Nail Co.....35%

Augers and Bits—

Com. Double Spur.....75¢ @ 75¢ & 10%
Boring Mach. Augers.....70¢ @ 75¢
Car Bits, 12-in. twist.....60¢ @ 60¢ & 10%
Jennings' Pattern.....60¢ @ 10¢ @ 70¢
Ford's Auger and Car Bits.....40&5
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....25%
No. 30, R. Jennings' list.....40&7 $\frac{1}{2}$ %
Russell Jennings' Pattern.....50¢ @ 10¢
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50¢ @ 10¢
Ohio Tool Co.'s Bailey Auger and Car Bits.....10&10%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....25%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60&10%
Wright's Jennings' Bits (R. Jennings' list).....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, 118; large, 138.....50&10%
Clark's Pattern, No. 1, $\frac{1}{2}$ doz. \$25.....25&10%
No. 2, 118.....50&10%
Ford's, Clark's Pattern.....50&10%
C. E. Jennings & Co., Steer's Pat.....60%
Swan's.....60%

Gimlet Bits—

Common Dble. Cut, gro. \$3.00 @ 5.25
German Pattern.....gro. \$4.50 @ 4.75

Hollow Augers—

Bonney Pat., per doz. \$9.00 @ 10.00
4&10%
New Patent.....25&10%
Universal.....25%
Wood's Universal.....25%

Ship Augers and Bits—

Ford's.....40%
C. E. Jennings & Co.:
L'Hommedieu's.....15%
Watrous.....35&5%
Ohio Tool Co.'s.....40%
Snell's.....40%

Awl Hafts—See Hafts, Awl.

Awls—

Brad Awls:
Handled.....gro. \$2.75 @ 3.00
Unhanded, Shl. dered.....gro. 63¢ @ 66¢
Unhanded, Patent.....gro. 66¢ @ 70¢
Peg Awls:
Unhanded, Patent, gro. 34¢ @ 34¢
Unhanded, Shl. dered.....gro. 65¢ @ 70¢
Scratch Awls:
Handled, Com.....gro. \$3.50 @ 4.00
Handled, Socket.....gro. \$11.50 @ 12.00
Hurwood.....40%

Awl and Tool Sets—See

Sets, Awl and Tool.

Axes—

Single Bit, base weights. (up to 3 $\frac{1}{2}$ lb.)
First Quality.....\$6.50
Second Quality.....\$5.75
NOTE—Heavier Weights add Extras as per regular schedule.

Axle Grease—

See Grease, Axle

Axles—

Iron or Steel
Concord, Loose Collar.....40¢ @ 45¢
Concord, Solid Collar.....45¢ @ 50¢
No. 1 Common.....35¢ @ 35¢
No. 1 $\frac{1}{2}$ Com., New Styles.....44¢ @ 45¢
No. 2 Solid Collar.....44¢ @ 45¢
Nos. 7, 8, 11 and 12.....75¢ @ 75¢ & 5%
Nos. 13 to 15.....70¢ @ 10¢ @ 75¢ & 5%
Nos. 15 to 18.....60¢ @ 10¢ @ 60¢ & 10¢ & 10%
Nos. 19 to 22.....70¢ @ 10¢ @ 75%
Boxes, Axle—

Common and Concord, not turned
lb. 4 $\frac{1}{4}$ ¢ @ 4 $\frac{1}{2}$ ¢
Common and Concord, turned.
lb. 5¢ @ 5 $\frac{1}{4}$ ¢
Half Patent.....lb. 9¢ @ 9 $\frac{1}{2}$ ¢

Bait—

Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%
Balances—Sash—
Caldwell new list.....50%
Pullman.....50¢ @ 10¢

Spring—

Spring Balances.....60¢ @ 60¢ & 5%
Chattillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....50%

Barb Wire—See Wire, Barb.

Bars—

Crow—
Steel Crowbars, 19 to 40 lb.
per lb. 2 $\frac{1}{2}$ ¢ @ 2 $\frac{1}{2}$ ¢

Towel—

No. 10 Ideal, Nickel Plate..... $\frac{1}{2}$ gro. \$8.50

Beams, Scale—

Scale Beams.....40¢ @ 10¢ @ 50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered $\frac{1}{2}$ doz. \$9.25;
Tinned.....\$1.00
No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.10;
Tinned.....\$1.20
No. 10 Wire Galvanized..... $\frac{1}{2}$ doz. \$1.75
Western W. G. Co.:
No. 1 Electric..... $\frac{1}{2}$ gro. \$7.80
No. 2 Buffalo..... $\frac{1}{2}$ gro. \$9.00
No. 3 Perfection Dust..... $\frac{1}{2}$ gro. \$8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned..... $\frac{1}{2}$ doz. \$1.20
Holt, No. 1, Tinned..... $\frac{1}{2}$ doz. \$1.50
Holt, No. B, Japanned..... $\frac{1}{2}$ doz. \$2.00
Holt, No. 2, Tinned..... $\frac{1}{2}$ doz. \$2.25
Lyon, No. 2, Japanned..... $\frac{1}{2}$ doz. \$1.25
Lyon, No. 3, Japanned..... $\frac{1}{2}$ doz. \$1.50
Taplin Mfg. Co.:
No. 60 Improved Dover.....\$6.00
No. 75 Improved Dover.....\$6.50
No. 100 Improved Dover.....\$7.00
No. 102 Improved Dover, Tin'd.....\$8.50
No. 150 Improved Dover, Hotel.....\$15.00
No. 152 Imp'd Dover, Hotel, T'd.....\$17.00
No. 200 Imp'd Dover Tumbler.....\$35.50
No. 202 Imp'd Dover Tumbler, T'd.....\$39.50
No. 300 Imp'd Dover Mammoth..... $\frac{1}{2}$ doz. \$25.00
Western, W. G. Co., Buffalo.....\$7.00
Wonder (S. S. & Co.), $\frac{1}{2}$ gro. net, \$6.00

Bellows—

Blacksmith, Standard List.....60¢ @ 10¢ @ 70¢ & 10%

Blacksmiths'—

Inch. 30 32 34 36 38 40
Each \$3.25 3.50 4.00 4.50 5.00 5.75
Extra Length:
Each \$3.75 4.25 4.75 5.25 6.00 7.00

Hand—

Inch. 6 7 8 9 10
Doz. \$4.50 5.00 5.50 6.00 6.50

Molders—

Inch. 9 10 11 12 14
Doz. \$8.00 9.00 10.50 12.50 14.50

Bells—

Ordinary goods.....75¢ @ 75¢ & 10%
High grade.....70¢ @ 10¢ @ 70¢ & 10¢ & 5%
Jersey Star.....75&10%
Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's.....60¢ @ 10¢ @ 60%
Trip Gong.....50¢ @ 10¢ @ 50¢ & 10¢ & 5%
Yankee Gong.....55%

Door—

Wrt Barrel Japd.....80¢ @ 80¢ & 10%
Wrt "Bronzed.....50¢ @ 50¢ & 10%
Wrt Spring.....70¢ @ 10¢ @ 70¢ & 10¢ & 10%
Wrt Shutter.....50¢ @ 50¢ @ 50¢ & 10¢ & 5%
Wrt Square Neck.....75¢ @ 75¢ & 10%

Hand—

Hand Bells, Polished, Brass.....60¢ @ 60¢ @ 10¢ & 5%
White Metal.....60¢ @ 60¢ @ 10¢ & 5%
Nickel Plated.....50¢ @ 10¢ @ 50¢ & 10¢ & 5%
Swiss.....60¢ @ 60¢ @ 75%
Cone's Globe Hand Bells.....33¢ @ 35%
Silver Chime.....33¢ @ 35%

Miscellaneous—

Farm Bells.....lb. 2 $\frac{1}{2}$ ¢
Steel Alloy Church and School
Gongs.....50¢ @ 10¢ @ 50¢ & 10¢ & 5%
American Tube & Stamping Co.
Table Call Bells.....50¢ @ 50¢ & 10%

Belt—Leather—

Extra Hvy, Short Lap.....60¢ @ 60¢ & 5%
Regular Short Lap.....65¢ @ 10¢ @ 70%
Standard.....70¢ @ 50¢ @ 70¢ & 10%
Light Standard.....70¢ @ 10¢ @ 75%
Cut Leather Lacing.....60¢ @ 10%
Leather Lacing Sides, per sq. ft.
17 $\frac{1}{2}$ ¢ @ 18¢

Rubber—

Agricultural (Low Grade).....75¢ @ 75¢ & 5%
Common Standard.....70¢ @ 70¢ & 10%
Standard.....65¢ @ 70%
Extra.....60¢ @ 50¢ @ 60¢ & 10%
High Grade.....50¢ @ 50¢ @ 10%

Bench Stops—

See Stops, Bench

Benders and Upsetters,

Tire—
Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters.....20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$4.25; No. 2, \$7.25;
No. 3, \$10.50; No. 4, \$16.25; No. 5, \$20.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain.....50%
Parts.....50%
Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—Tackle—

Common Wooden.....70¢ @ 10¢ @ 75¢ & 5%
Harts St. Tackle Blocks.....50¢ @ 50¢ & 5%
Hollow Steel Blocks, with Ford's Patent Sheaves.....50&10%
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....30¢ @ 10¢ @ 40¢ & 10%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....38 $\frac{1}{2}$ ¢

Bolts—

Carriage, Machine, &c.—
Common Carriage:
 $\frac{1}{2}$ & 6 and Smaller.....75¢ @ 10¢ @ 80%
Larger sizes.....75¢ @ 75¢ & 5%
Phila. Eagle \$3.00 list May 24, '99
80¢ @ 10%

Bolt Ends, list Feb. 14, '95, 75¢ @ 75¢ & 5%
Machine, $\frac{1}{2}$ & 4 and smaller
75¢ @ 10¢ & 5%
Machine, larger and longer, 75¢ & 5%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:
Inch.....3 4 5 6 8
Per doz. \$9.30 96 45 55 75
Cast Iron Spring Foot:
Inch.....6 8 10
Per doz. \$1.15 1.40 2.00
Cast Iron Chain, Flat Japanned:
Inch.....6 8 10
Per doz. \$0.95 1.25 1.55
Cast Iron Shutter, Brass Knobs:
Inch.....6 8 10
Per doz. \$0.80 .90 1.20

Wrt Barrel Japd.....80¢ @ 80¢ & 10%
Wrt "Bronzed.....50¢ @ 50¢ & 10%
Wrt Spring.....70¢ @ 10¢ @ 70¢ & 10¢ & 10%
Wrt Shutter.....50¢ @ 50¢ @ 50¢ & 10¢ & 5%
Wrt Square Neck.....75¢ @ 75¢ & 10%

Wrt Square, 66 $\frac{1}{2}$ ¢ @ 10¢ @ 66 $\frac{1}{2}$ ¢ @ 10¢ & 10%
Ives' Patent Door.....60%

Stove and Plow—

Plow.....70¢ @ 10¢ @ 70¢ & 10¢ & 5%
Stove.....82 $\frac{1}{2}$ ¢ @ 82 $\frac{1}{2}$ ¢ & 5%

Tire—

Common.....72 $\frac{1}{2}$ %
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84.....80%
Eagle Phila., list Oct. 16, '84.....82 $\frac{1}{2}$ %
Bay State, list Dec. 28, '99.....72 $\frac{1}{2}$ %
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84.....82 $\frac{1}{2}$ %
Eagle Phila., list Oct. 16, '84.....82 $\frac{1}{2}$ %
Eclipse, list Dec. 28, '99.....72 $\frac{1}{2}$ %
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....72 $\frac{1}{2}$ %
Norway Phila., list Oct., '84.....80%
Upon Nut Co.:
Tire Bolts.....72 $\frac{1}{2}$ %

Borers, Tap—

Borers Tap, Ring, with Handle:
Inch.....1 $\frac{1}{4}$ 1 $\frac{1}{2}$ 1 $\frac{3}{4}$ 2
Per doz. \$4.30 5.00 5.75 7.25
Inch.....2 $\frac{1}{4}$ 2 $\frac{1}{2}$ 2 $\frac{3}{4}$ 3
Per doz. \$5.65 11.50
Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.65; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon.....15&10%
Perfection..... $\frac{1}{2}$ doz. \$30.00
Schutz.....40%

Braces—

Common Ball, American, \$1.15 @ 1.25
Barber's.....50¢ @ 10¢ @ 60¢ & 10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 411.....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat.....50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat. 60¢ @ 10¢ & 65%

Brackets—

Wrought Steel.....80¢ @ 10¢ @ 10%
Bradley's Wire Shelf:
Full cases.....80¢ @ 10¢ & 10%
Broken cases.....80¢ @ 10%
Griffin's Pressed Steel.....80%
Griffin's Folding Brackets.....70¢ @ 10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Western, W. G. Co.....80%
Wire Goods Co.....75¢ @ 75¢ & 10%

Buckets, Galvanized—

Price per dozen:
Quart.....19 12 14
Water, Regular.....1.40 1.70 1.90
Water, Heavy.....3.40 3.70 3.80
Fire, Rd. Bottom.....2.30 2.55 2.95
Well.....2.55 2.87 3.15

Bucks, Saw—

Hoosier..... $\frac{1}{2}$ gro. \$36.00

Bull Rings—See Rings, Bull

Butts—Brass—

Wrought, list Sept., '96.....30%
Cast Brass, Tiebout's.....50%

Cast Iron—

Fast Joint, Broad.....50¢ @ 50¢ & 10%
Fast Joint, Narrow.....50¢ @ 50¢ & 10%
Loose Joint.....70¢ @ 50¢ @ 70¢ & 10%
Loose Pin.....70¢ @ 50¢ @ 70¢ & 10%
Mayer's Hinges.....70¢ @ 50¢ @ 70¢ & 10%
Parliament Butts.....70¢ @ 50¢ @ 70¢ & 10%

Wrought Steel—

Table and Back Flaps.....75%
Narrow and Broad.....75%
Inside Blind.....75¢ @ 10%
Loose Pin.....75%
Loose Pin, Ball and Steeple Tip.....50¢ @ 20%
Japanned Ball Tip Butts.....70&10%
Bronzed, Wrt., Nar. and Inside Blind Butts.....55&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33%
200, 300, 600 and 900 series.....50&10%
Hendryx, Bronze:
700 800 series.....40&10%
Hendryx, Enameled.....40&10%

Callipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong.....per lb. 4¢
 Sharp, 1 prong.....per lb. 4¢
 Gautier, Blunt.....4¢
 Gautier, Sharp.....4¢
 Perkins, Blunt Toe.....3¢
 Perkins, Sharp Toe.....4¢

Can Openers—

See Openers, Can.

Cans, Milk—

Illinois Pattern.....\$1.35 1.25 2.05 each.
 New York Pattern.....1.50 2.20 2.45 each.
 Baltimore Pattern.....1.50 2.20 2.45 each.
 Dubuque.....1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
 3 5 10 gal.
 \$48.00 60.00 129.60 gro., net.

Caps, Percussion—

Eley's E. B.....52¢
 G. D.....per M 34¢
 F. L.....per M 44¢
 G. E.....per M 48¢
 Musket.....per M 62¢

Primers—

Berdan Primers, \$2 per M. 20¢
 B. L. Caps (Sturtevant Shells)
 \$2 per M.....20¢
 All other primers per M. \$1.52@1.60

Cartridges—

Blank Cartridges:
 32 C. F., \$5.50.....10¢
 38 C. F., \$7.00.....10¢
 22 cal. Rim, \$1.50.....10¢
 32 cal. Rim, \$2.75.....10¢
 B. B. Caps, Con. Ball, Sg'd. \$1.90
 B. B. Caps, Round Ball.....1.49
 Central Fire.....25¢
 Target and Sporting Rifle.....15¢
 Primed Shells and Bullets.....15¢
 Rim Fire, Sporting.....50¢
 Rim Fire, Military.....15¢

Castors—

Bed.....70¢
 Plate.....60¢
 Philadelphia.....75¢
 Acme, Ball Bearing.....35¢
 Boss Anti-Friction.....70¢
 Gem (Roller Bearing).....80¢
 Martin's Patent (Phoenix).....45¢
 Standard Ball Bearing.....45¢
 Tucker's Patent low list.....50¢
 Yale (Double Wheel) low list.....30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
 3-16 5-16 7-16 9-16
 7-16 5-16 4-15 3-15 3-20 3-15
 5-16 7-16 9-16 1 to 1 1/4 inch.
 3-10 3-00 2-95 2-95 per 100 lb.
 German Coil.....60¢

Halters and Ties—

Halter Chains.....60¢
 German Pattern Halter Chains,
 list July 24, '97.....60¢
 Cow Ties.....60¢

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
 6-3, Strght, with ring \$23.50
 6-6, Strght, with ring \$24.50
 6-8, Strght, with ring \$28.00
 6-10, Strght, with ring \$32.00
 NOTE—Add 2¢ per pair for Hooks.
 Twist Traces 2¢ per pair higher than
 Straight Link.

Trace, Wagon and Fancy

Chains.....60¢

Miscellaneous—

Jack Chain, list July 10, '93:
 Iron.....60¢
 Brass.....60¢
 Safety Chain.....75¢
 Gal. Pump Chain.....4¢
 Covert Mfg. Co.:
 Breast.....40¢
 Halter.....40¢
 Heel.....40¢
 Rein.....40¢
 Stallion.....40¢
 Covert Sad. Works:
 Breast.....70¢
 Halter.....70¢
 Hold Back.....70¢
 Rein.....70¢
 Oneida Community:
 Am. Coll and Halters.....40¢
 Am. Cow Ties.....45¢
 Eureka Coll and Halter.....45¢
 Niagara Coll and Halter.....45¢
 Niagara Cow Ties.....45¢
 Niagara Wire Dog Chains.....45¢
 Wire Goods Co.:
 Dog Chain.....70¢
 Universal Dbl.-Jointed Chain.....50¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 35¢
 Carpenters' Red.....gro. 30¢
 Carpenters' White.....gro. 25¢

Checks, Door—

Bardsley's.....45¢
 Columbia.....50¢
 Eclipse.....60¢

Chests, Tool—

American Tool Chest Co.:
 Boy's Chests, with Tools.....50¢
 Youths' Chests, with Tools.....40¢
 Gentlemen's Chests, with Tools.....30¢
 Farmers' Carpenters', etc., Chests,
 with Tools.....20¢
 Machinists' and Pipe Fitters'
 Chests, Empty.....50¢
 Tool Cabinets.....50¢
 C. E. Jennings & Co.'s Machinists'
 Tool Chests.....35¢

Chisols—**Socket Framing and Firmer**

Standard List.....70¢
 Buck Bros.....70¢
 Charles Buck.....70¢
 C. E. Jennings & Co. Socket Firmer
 No. 10.....60¢
 C. E. Jennings & Co. Socket Fram-
 ing No. 15.....70¢
 Ohio Tool Co.....70¢
 Swan's.....70¢
 L. & I. J. White.....30¢

Tanged—

Tanged Firmers.....40¢
 Buck Bros.....40¢
 Charles Buck.....40¢
 C. E. Jennings & Co. Nos. 191, 181, 25
 L. & I. J. White, Tanged.....25¢

Cold—

Cold Chisels, good quality.....13¢
 Cold Chisels, fair quality.....11¢
 Cold Chisels, ordinary.....9¢

Chucks—

Beach Pat., each \$8.00.....35¢
 Pratt's Positive Drive.....25¢
 Empire.....25¢
 Blacksmiths'.....25¢
 Skinner Patent Chucks:
 Independent Lathe Chucks.....50¢
 Universal.....50¢
 Combination.....50¢
 Drill Chucks, New Model.....30¢
 Drill Chucks, Standard.....40¢
 Drill Chucks, Skinner Pat., 0.1, 2.40
 Drill Chucks, Skinner Pat., 3, 4,
 5, 6, 8.....30¢
 Planer Chucks.....25¢
 Face Plate Jaws.....40¢
 Standard Tool Co.:
 Improved Drill Chuck.....45¢
 Union Mfg. Co.:
 Combination.....35¢
 Geared Scroll.....40¢
 Geared Scroll.....40¢
 Independent.....50¢
 Independent Steel.....40¢
 Union Drill.....45¢
 Universal.....40¢
 Independent Iron F. Plate Jaws.....40¢
 Independent Steel F. Plate Jaws.....40¢
 Westcott Patent Chucks:
 Lathe Chucks.....50¢
 Little Giant Auxiliary Drill.....50¢
 Little Giant Double Grip Drill.....50¢
 Little Giant Drill, Improved.....50¢
 Onoda Drill.....50¢
 Scroll Combination Lathe.....50¢

Clamps—

Adjustable, Hammers.....20¢
 Cabinet, Sargent's.....50¢
 Carriage Makers', P. S. & W. Co.....60¢
 Carriage Makers', Sargent's.....60¢
 Besly, Parallel.....35¢
 Lineman's, Utica Drop Forge & Tool
 Co.....40¢
 Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55¢
 Iwan's Champion, Stationary.....45¢

Sidewalk—

Star Socket, All Steel, 3/4 doz. \$4.05 net
 Star Shank, All Steel, 3/4 doz. \$3.24 net
 W. & C. Shank, All Steel, 3/4 doz.,
 7 1/2 in., \$3.00; 8 in., \$3.25.

Cleavers, Butchers'—

Foster Bros.....30¢
 New Haven Edge Tool Co.....45¢
 Fayette B. Plumb.....35¢
 L. & I. J. White.....30¢

Clippers—

Chicago Flexible Shaft Company:
 186 Chicago Horse.....\$9.75 15¢
 1902 Chicago Horse.....10.75 15¢
 20th Century Horse, each.....30.00 20¢
 Lightning Belt.....15.00 15¢
 Chicago Belt.....20.00 15¢
 Stewart's Patent Sheep.....12.75 20¢

Finger Nail Clippers—

Smith & Hemenway Co. 3/4 doz. net \$2.00

Clips, Axle—

Eagle, 5-16 and 3/4 in. 75¢
 Norway, 5-16 and 3/4 in. 60¢
 Cloth and Netting, Wire
 —See Wire, &c.

Cocks, Brass—

Hardware list:
 Compression, Plain Bibbs,
 Globe, Kerosene, Racking,
 &c., Cocks.....70¢

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
 Son's list.....40¢
 Leather, Walter B. Stevens & Son's
 list.....40¢

Combs, Curry—

Metal Stamping Co.....40¢

Mane and Tail—

Covert's Saddlery Works.....60¢

Compasses, Dividers, &c.

Ordinary Goods.....75¢
 Benini & Call Hdw. & Tool Co.:
 Dividers.....65¢
 Calipers, Double.....65¢
 Calipers, Inside or Outside.....65¢
 Calipers, Wing.....60¢
 Compasses.....50¢

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory. Nested. Not nested.
 A Eastern.....75¢
 B Eastern.....75¢
 Central.....70¢
 Southern.....70¢
 S. Western.....70¢

Terms, 60 days; 5% cash 10 days. Fac-
 tory shipments generally delivered.
 See also Eave Troughs.

Coolers, Water—

Gal, each.....2 3 4 6 8
 Labrador.....\$1.20 \$1.50 \$1.80 \$2.10 \$2.70
 Iceland.....3 4 6 8
 Gal.....\$1.80 \$2.10 \$2.40 \$3.00
 Galv. Lined, ea.....\$1.25 \$2.00 \$2.25 \$2.90 \$3.90
 25¢
 Galv. Lined, side handles,
 Gal.....2 3 4 6 8
 Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$4.15 25¢

Coopers' Tools—

See Tools, Coopers'.

Cord—

Braided, Drab.....lb. 35¢
 Braided, White, Com.....lb. 25¢
 Cable Laid Italian.....lb. 25¢
 lb., A, 18¢; B, 16¢
 Common India.....lb. 10¢
 Cotton Sash Cord, Twisted.....lb. 17¢
 Patent Russia.....lb. 14¢
 Cable Laid Russia.....lb. 15¢
 India Hemp, Braided.....lb. 13¢
 India Hemp, Twisted.....lb. 12¢
 Patent India, Twisted.....lb. 12¢
 Anniston Cordage Co.: Braided Cotton,
 Old Glory, Nos. 7 to 12.....lb. 28¢
 Anniston, Nos. 7 to 12.....lb. 22¢
 Old Colony, Nos. 7 to 12.....lb. 22¢
 Anniston Drab, Nos. 7 to 12.....lb. 26¢
 Pearl Braided, cotton, No. 6, 8, 10,
 25¢; No. 7, 22¢; Nos. 8 to 12, 22¢.
 Edgystone Braided, Nos. 7, 8, 9 and
 10.....lb. 24¢
 Edgystone Braided Cotton, No. 10,
 lb. 25¢
 Harmony Cable Laid Italian, Nos. 7
 to 10.....lb. 23¢
 Peerless:
 Cable Laid Italian.....16¢
 Cable Laid Russian.....14¢
 Cable Laid India.....12¢
 Braided India.....18¢
 Samson, Nos. 8 to 12:
 Braided, Drab Cotton.....lb. 40¢
 Braided, Italian Hemp.....lb. 40¢
 Braided, Linen.....lb. 55¢
 Braided, White Cotton or Spot.....lb. 35¢
 Massachusetts, White.....lb. 28¢
 Massachusetts, Drab.....lb. 32¢
 Phoenix, White, Nos. 8 to 12, 24¢;
 No. 7, 24¢; No. 6, 25¢.

Wire, Picture—

List Oct., '00.....85¢
 Hendryx Standard Wire Picture Cord,
 85¢
 Grain.....40¢

Cradles—

White Round Crayons, gr. 5/4@6¢
 Cases, 100 gro., \$4.00, at factory.
 D. M. Steward Mfg. Co.:
 Metal Workers' Crayons, gr. 5/4
 Soapstone Pencil, round, flat
 or square.....gr. 1.50
 Rolling Mill Crayons.....gr. 2.50
 Railroad Crayons (composition)
 gr. 2.00

Crooks, Shepherds'—

Fort Madison, Heavy.....3/4 doz. \$7.00
 Fort Madison, Light.....3/4 doz. \$6.50

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden.....50¢

Cutlery, Table—

International Silver Company:
 No. 12 M'd'm Knives, 1847, 3/4 doz. \$3.50
 Star, Eagle, Rogers & Hamilton
 and Anchor.....3/4 doz. \$3.00
 Wm. Rogers & Son.....3/4 doz. \$2.50

Cutters—

H. H. Mayhew Co.....40¢
 Red Devil.....50¢
 Smith & Hemenway Co.....50¢
 Woodward.....40¢

Meat and Food—

American.....30¢
 Each.....\$5 \$7 \$10 \$25 \$50 \$90
 Enterprise.....25¢
 No. 5.....5 10 12 22 32
 Each.....\$2 \$3 \$2.75 \$4.50 \$6
 Dixon's.....3/4 doz. 30¢
 No. 1.....\$14.00 \$17.00 \$19.00 \$30.00
 Ideal.....40¢
 Little Giant.....3/4 doz. 33¢
 No. 305 310 312 320 322
 \$35.00 \$48.00 \$44.00 \$72.00 \$66.00
 N. E. Food Choppers.....40¢
 New Triumph No. 605, 3/4 doz. \$24.00
 Ruswin Food, No. 1, \$24.00; No. 2,
 \$27.00
 Woodruff's.....3/4 doz. 30¢
 No. 100.....100 150
 Enterprise Beef Shavers.....25¢

Slaw and Kraut—

Henry Diaston & Sons:
 Slaw, Corn Grater, &c.....40¢
 Kraut Cutters, 24 x 7, 26 x 8, 30
 x 9.....50¢
 Kraut Cutters, 36 x 12, 10 x 15.....40¢
 J. M. Mast Mfg. Co.:
 Slaw Cutters, 1 Knife.....3/4 doz. \$3.00
 Combined Slaw Cutter and Corn
 Grater.....3/4 doz. \$4.00
 Tucker & Dorney Mfg. Co.:
 Kraut Cutters.....40¢
 Slaw Cutters, 1 Knife, 3/4 gr. \$18.00
 Slaw Cutters, 2 Knife, 3/4 gr. \$22.00

Tobacco—

All Iron, Cheap.....doz. \$4.25@4.50
 Enterprise.....25¢
 National, 3/4 doz., No. 1, \$21; No. 2,
 \$18
 Sargent's, 3/4 doz., No. 2.....40¢
 Sargent's, Nos. 12 and 21.....60¢

Washer—

Appleton's, 3/4 doz., \$16.00.....50¢

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger, per doz. \$9.00
 Iwan's Imp'ed Post Hole Auger.....40¢
 Iwan's Vaughan Pattern Post Hole
 Augers.....3/4 doz. \$6.25
 Iwan's Perfection Post Hole Digger.....
 Iwan's Split Handle Post Hole Dig-
 gers.....3/4 doz. \$7.25
 Kohler's Universal.....3/4 doz. \$15.00
 Kohler's Little Giant.....3/4 doz. \$12.00
 Kohler's Hercules.....3/4 doz. \$10.00
 Kohler's Invincible.....3/4 doz. \$9.00
 Kohler's Rival.....3/4 doz. \$8.00
 Kohler's Pioneer.....3/4 doz. \$7.25
 Never-Break Post Hole Diggers,
 doz., \$24.00.....60¢
 Samson, 3/4 doz. \$34.00.....25¢

Dividers—See Compasses.**Doors, Screen—**

Phillips', style E, 3/4 in.....3/4 doz. \$10.50
 Phillips', style 077, 3/4 in.....3/4 doz. \$9.00
 Phillips', style x-y, 3/4 in.....3/4 doz. \$11.00

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, 3/4
 doz., \$18; No. 2, \$15; No. 3, \$12;
 No. 4, \$18.

Drawing Knives—

See Knives, Drawing.

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers.....35¢
 Diamond Wheel Dresser Cutters.....35¢

Drills and Drill Stocks—

Common Blacksmiths' Drill,
 each.....\$1.50@1.75
 Breast, Millers Falls.....15¢
 Breast, P. S. & W.....40¢
 Goodell Automatic Drills.....40¢
 Johnson's Automatic Drills, Nos. 2
 and 3.....16¢
 Johnson's Drill Points.....16¢
 Millers Falls Automatic Drills.....33¢
 Ratchet, Curtis & Curtis.....40¢
 Ratchet, Parker.....40¢
 Ratchet, Weston's.....30¢
 Ratchet, Whitney's, P. S. & W. 50¢
 Whitney's Hand Drill No. 1, \$10.00;
 Adjustable, No. 10, \$12.00.....33¢

Twist Drills—

Bit Stock.....60¢
 Taper and Straight Shank.....60¢

Drivers, Screw—

Screw Driver Bits, per doz. 45¢
 Balsey's Screw Holder and Driver, 3/4
 doz., 2 1/2-in., \$6; 4-in., \$7.50; 6-in.,
 \$9

Buck Bros' Screw Driver Bits.....40¢
 Champion.....30¢
 Edson.....60¢
 Fray's Hol. H'dle Sets, No. 3, \$12.50
 Gay's Double Action Ratchet.....35¢
 Goodell's Auto.....50¢
 Hurwood.....40¢
 Mayhew's Black Handle.....40¢
 Mayhew's Monarch.....40¢
 Millers Falls, Nos. 20 and 21.....25¢
 Millers Falls, Nos. 11, 12, 41, 42.....15¢
 Never Turn.....50¢
 New England Specialty Co.....50¢
 Sargent & Co.:
 Nos. 1 and 62.....50¢
 Nos. 50 and 55.....50¢
 Nos. 20 and 40.....70¢
 Smith & Hemenway Co.....40¢
 H. D. Smith & Co.'s Perfect H'dle.....40¢
 Stanley R. & L. Co.:
 No. 44 Varn. Handles.....70¢
 No. 55.....70¢
 Swan's:
 Nos. 65 to 68.....50¢
 No. 40.....40¢
 Nos. 25, 35 and 45.....30¢

Eave Trough, Galvanized—

L. C. L.
 A Eastern.....80¢
 B Eastern.....80¢
 Central.....80¢
 Southern.....70¢
 S. Western.....75¢
 Terms—2 1/2% for cash. Factory ship-
 ments generally delivered.
 See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments:
 Plain Rd., and Cor., 2, 3 and
 4 in.....75¢
 Plain Rd., and Cor., 5 and 6
 in.....60¢
 Perfect Elbows (S. S. & Co.).....40¢

Emery, Turkish—

40 1/2 5 1/2 150 Flour
 Kegs.....lb. 5¢ 5 1/4¢ 3 1/4¢
 1/2 Kegs.....lb. 5 1/4¢ 5¢ 3 1/4¢
 Kegs.....lb. 5¢ 5¢ 3¢
 10-lb. cans, 10
 in case.....1 1/4¢ 7¢ 6¢
 10-lb. cans, less
 than 10.....10¢ 10¢ 8¢
 NOTE—In lots 1 to 3 tons a discount
 of 10% is given.

Extractors, Lemon Juice

—See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's.....50¢
 Walling's.....45¢

Cord and Weight—

Ives.....40¢

Faucets—

Cork Lined.....	50¢@50¢10%
Metallic Key, Leather Lined.....	70¢@70¢10%
Red Cedar.....	40¢@40¢10%
Petroleum.....	70¢@70¢10%

B. & L. R. Co.: Metal Key.....	60¢@10%
Star.....	60¢@10%
West Lock.....	60¢@10%
John Sommer's Peerless Tin Key.....	50¢@10%
John Sommer's Boss Tin Key.....	50¢@10%
John Sommer's Victor Mtl. Key.....	50¢@10%
John Sommer's Duplex Metal Key.....	50¢@10%
John Sommer's Diamond Lock.....	50¢@10%
John Sommer's I. X. L. Cork Lined.....	50¢@10%
John Sommer's Reliable Cork Lined.....	50¢@10%

John Sommer's Chicago Cork Lined.....	50¢@10%
John Sommer's O. K. Cork Lined.....	50¢@10%
John Sommer's No Brand, Cedar.....	50¢@10%
John Sommer's Perfection, Cedar.....	50¢@10%
McKenna, Brass: Burglar Proof, N. P.....	25¢
Improved, 3/4 and 1/2 inch.....	25¢
Self Measuring: Enterprise, 3/4 doz. \$36.00.....	40¢@10%
Lane's, 3/4 doz. \$36.00.....	40¢@10%
National Measuring, 3/4 doz. \$36.40.....	40¢@10%

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List revised Nov. 1, 1899.

Best Brands.....	70¢@10¢75¢5%
Standard Brands.....	75¢@10¢75¢10¢10%
Lower Grade.....	75¢@10¢10¢80¢10%

Imported—

Stubs' Tapers, Stubs' List, July 24, '97.....	30%
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Fixtures, Fire Door—

Richards Mfg. Co.: Universal, No. 103.....	\$4.00
Special, No. 104.....	\$4.00
Fusible Links.....	30.25
Expansion Bolts.....	50¢@10%

Grindstone—

Net Prices:									
Inch.....	15	17	19	21	24				
Per doz.....	\$2.15	2.85	3.25	3.75	4.50				
P. S. & W. Co.....	30¢@10¢40%								
Reading Hardware Co.....	60%								
Sargent's.....	70%								
Stowell's Giant Grindstone Hanger.....	70%								
Stowell's Grindstone Fixtures.....	70%								
Heavy.....	60¢@10%								
Stowell's Grindstone Fixtures, Light.....	60¢@10%								

Fodder Squeezers—

See Compressors.

Forks—

Base Discounts Aug. 1, 1899, list:									
Hay, 2 time.....	50¢@10¢5%								
Boys' & Fish, 2 time.....	50¢@10¢5%								
Hay & Boys, 3 time.....	60¢@5%								
Hay & Boys, 4 time.....	66¢@5%								
Champion Hay.....	66¢@5%								
Hay & Header, long 3 time.....	65¢								
Header, 4 time.....	65¢								
Barley 4 & 5 time, Steel.....	60¢@20%								
Manure, 4 time.....	60¢@15¢24%								
Manure, 5 & 6 time.....	66¢@24%								
Spading.....	70¢@24%								
Potato Digger, 6 time.....	60¢@10%								
Sugar Beet.....	40¢@10%								
Coke & Coal.....	40¢@10%								
Heavy Mill & Street.....	65¢								
Iowa Dig-Ezy Potato.....	60¢@10%								
Victor, Hay.....	60¢@15¢24%								
Victor, Manure.....	66¢								
Victor, Header.....	65¢								
Champion, Hay.....	66¢								
Champion, Header.....	66¢								
Champion, Manure.....	60¢@15¢24%								
Columbia, Hay.....	60¢@20%								
Columbia, Manure.....	70%								
Columbia, Spading.....	70¢@12%								
Hawkeye Wood Barley.....	40%								
W. & C. Potato Digger.....	60¢@10%								
Acme, Hay.....	60¢@20%								
Acme, Manure, 4 time.....	60¢@10¢5%								
Dakota Header.....	60¢@20%								
Jackson Steel Barley.....	60¢@20%								
Kansas Header.....	65¢								
W. & C. Favorite Wood Barley.....	40%								
Plated—See Spoons.									

Frames— Saw—

White, 8'g't Bar, per doz.....	75¢@80¢
Red, 8'g't Bar, per doz.....	\$1.00@1.25
Red, Dbl. Brace, per doz.....	\$1.40@1.50

Freezers, Ice Cream—

Qt.....	1	2	3	4	6
Each.....	\$1.25	\$1.60	\$1.90	\$2.20	\$2.50

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**

Per 1000 Feet.									
Hemp.....	\$2.75								
Cotton.....	3.20								
Waterproof Sgl. Taped.....	.65								
Waterproof Dbl. Taped.....	.40								
Waterproof Tpl. Taped.....	.15								

Gates, Molasses and Oil—

Stebbins' Pattern.....	80¢@10¢80¢10¢5%
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Gauges—

Marking, Mortise, &c.....	50¢@10¢50¢10¢10¢5%
Chapin-Stephens Co.: Marking, Mortise, &c.....	50¢@10¢50¢10¢10%
Scholl's Patent.....	50¢@10¢50¢10¢10%
Door Hangers.....	50¢@10%
Stanley R. & L. Co.'s Butt and Rabbit Gauge.....	20¢@10¢10%
Wire, Brown & Sharpe's.....	25¢
Wire, Morse's.....	25¢
Wire, P. S. & W. Co.....	30¢@10%

Gimlets— Single Cut—

Nail, Metal, Asst., gro.....	\$1.40@1.50
Spike, Metal, Asst., gro.....	\$2.80@3.50
Nail, Wood Handled, Assorted, gro.....	\$1.75@2.00
Spike, Wood Handled, Assorted, gro.....	\$1.25@1.50

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co.....	60¢@60¢10¢10%
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Glue, Liquid Fish—

Bottles or Cans, with Brush.....	25¢@50%
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Cans (1/2 pts., pts., qts., 1/2 gal., gal.).....	25¢@48%
International Glue Co. (Martin's).....	40¢@10%

Grease, Axle—

Common Grade.....	gro. \$4.50@5.50
Dixon's Everlasting, 10-lb pails, ea.....	85¢
Dixon's Everlasting, in boxes, 3 doz.....	1 lb, \$1.20; 2 lb, \$2.00

Grips, Nipple—

Perfect Nipple Grips.....	40¢@10¢2%
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Griddles, Soapstone—

Pike Mfg. Co.....	33¢@33¢10%
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Grindstones—

Bicycle Emery Grinder.....	\$6.50
Bicycle Grindstones, each.....	\$2.50@3.00
Pike Mfg. Co.: Improved Family Grindstones, per inch, 3/4 doz.....	\$2.00
Pike Mower and Tool Grinder, each.....	\$6.00
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....	\$3.25

Halters and Ties—

Covert Mfg. Co.: Web.....	45¢
Jute Rope.....	50¢@5%
Sisal Rope.....	35¢@5%
Cotton Rope.....	45¢@5%
Hemp Rope.....	45¢@5%
Covert's Saddlery Works: Web and Leather Halters.....	70%
Jute and Manila Rope Halters.....	70%
Sisal Rope Halters.....	60¢@20%
Jute, Manila and Cotton Rope Ties.....	70%
Sisal Rope Ties.....	60¢@10%

Hammers—**Handled Hammers—**

Heller's Machinists'.....	40¢@10¢40¢10%
Heller's Farriers.....	40¢@10¢40¢10%
Magnetic Tack, Nos. 1, 2, 3.....	\$1.25
\$1.50, \$1.75.....	40¢@10¢40%
Peck, Stow & Wilcox.....	40¢@10¢5%
Fayette R. Plumb: Plumb, A. E. Nail.....	33¢@7¢33¢@10¢7%
Engineers' and R. S. Hand.....	50¢@7¢50¢@10¢7%
Machinists' Hammers.....	50¢@50¢10¢5%
Riveting and Tinnings.....	40¢@24¢40¢@10¢24%
Sargent's C. S. New List.....	40%

Heavy Hammers and Sledges—

Under 3 lb., per lb.....	50¢
80¢@10¢10¢85%	
3 to 5 lb., per lb.....	40¢
80¢@10¢10¢85%	
Over 5 lb., per lb.....	30¢
85¢@85¢10%	
Wilkinson's Smiths'.....	1 lb. 9¢@10¢

Handles—

Agricultural Tool Handles Axe, Pick, &c.....	60¢@60¢10%
Hoe, Rake, &c.....	45¢@50¢5%
Fork, Shovel, Spade, &c.....	45¢@50¢5%
Long Handles.....	45¢@50¢5%
D Handles.....	40%

Cross-Cut Saw Handles—

Atkins'.....	40¢@5%
Champion.....	45¢@15¢10%
Disston's.....	50%

Mechanics' Tool Handles—

Auger, assorted.....	gro. \$2.50@2.85
Brad Acl.....	gro. \$1.65@1.85

Chisel Handles: Apple Tanged Firmer, gro. assorted.....	\$2.40@2.65
Hickory Tanged Firmer, gro. assorted.....	\$2.15@2.40
Apple Socket Firmer, gro. assorted.....	\$1.75@1.95
Hickory Socket Firmer, gro. assorted.....	\$1.45@1.60
Hickory Socket Framing, gro. assorted.....	\$1.60@1.75
File, assorted.....	gro. \$1.30@1.40
Hammer, Hatchet, Axe, &c.....	60¢@10¢60¢10¢10%

Hand Saw, Varnished, doz. 80¢@85¢; Not Varnished.....	65¢@75¢
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Plane Handles: Jack, doz. 30¢; Jack, Bolted.....	75¢
Fore, doz. 45¢; Fore, Bolted.....	90¢
Chapin-Stephens Co.: Caring Tool.....	40¢@40¢10%
Chisel.....	65¢@65¢10%
File and Awl.....	65¢@65¢10%
Saw and Plane.....	40¢@40¢10%
Screw Driver.....	40¢@40¢10%
Millers Falls Adj. and Hatchet Auger Handles.....	15¢@10%
Nicholson Simplicity File Handle.....	7¢ gro. \$9.85@11.50

Hangers—

NOTE—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.	
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Barn Door, New Pattern, Round Groove, Regular: Inch.....	3 4 5 6 8
Single Doz.....	\$0.90 1.25 1.60 1.95 2.50

Barn Door, New England Pat-

tern, Check Back, Regular: Inch.....	3 4 5 6
Single Doz.....	\$1.30 1.85 2.50 3.00

Allith Mfg. Co.: Reliable, No. 1.....	per doz. \$8.00
Reliable, No. 2.....	per doz. \$9.50

Chicago Spring Butt Co.: Friction.....	25%
Oscillating.....	25%
Big Twin.....	25%
Chisholm & Moore Mfg. Co.: Baggage Car Door.....	50%
Elevator.....	30%
Railroad.....	50%
Cronk & Carrier Mfg. Co.: Loose Axle.....	60¢@10¢5%
Roller Bearing.....	70¢@5%

Griffin Mfg. Co.: Solid Axle, No. 10.....	\$12.00.....70%
Roller Bearing, No. 11.....	\$15.00.....70%
Roller Bearing, Ex. Hy., No. 22.....	\$18.00.....70%
Hinged Hangers.....	\$16.00.....60¢@10%

Lane Bros. Co.: Parlor, Ball Bearing.....	\$4.00
Parlor, Standard.....	\$3.15
Parlor, No. 105.....	\$2.85
Parlor, New Model.....	\$2.80
Parlor, New Champion.....	\$2.25
Barn Door, Standard.....	60¢@10¢24%
Hinged.....	net. \$6.40
Covered.....	60¢@5%
Special.....	70¢@5%

Lawrence Bros.: Advance.....	60¢@10%
Cleveland.....	70¢@5%
Clipper, No. 75.....	60%
Crown.....	60¢@10%
Easy Parlor Door Dbl. Sets, \$2.50; Single Sets, \$1.25.....	60¢@5%
Giant.....	70¢@5%
Hummer.....	70¢@5%
New York.....	60¢@10%
Peerless.....	70¢@5%
Skinner.....	60¢@10%

McKinney Mfg. Co.: No. 1, Special.....	\$15.....60¢@10%
No. 2, Standard.....	\$18.....60¢@10%
Hinged Hangers.....	\$16.....50%
Meyers Stayon Hangers.....	60%

Richards Mfg. Co.: Pioneer Wood Track No. 3.....	\$2.15
Ball B'r'g St'l Track No. 10.....	\$2.40
Roller B'r'g St'l Track No. 12.....	\$2.30
Ball B'r'g St'l Track No. 13.....	\$2.40
Roller B'r'g St'l Track No. 14.....	\$2.30
Hero, Adj. Track No. 19.....	\$4.00
Adjustable Track Trolley.....	50%
Key Track No. 16.....	50%
Seal, Steel Track No. 8.....	\$2.40
Auto Adj. Track No. 22.....	40¢@10%
Trolley B. D. No. 17.....	\$1.40
Trolley F. D. No. 120.....	\$2.35
Trolley F. D. No. 121.....	\$2.45
Trolley F. D. No. 150.....	\$2.60

Safety Underwriters F. D. No. 101.....	\$2.22
Tandem No. 44.....	70¢@5%
Trolley F. D. No. 151.....	\$3.00
Palace, Adjustable Track No. 132.....	Adjustable Track No. 132.....40¢@10%
Royal, Adjustable Track No. 122.....	40¢@10%
Ives' Wood Track No. 1.....	\$2.15
Trolley B. D. No. 20.....	\$1.30
Trolley B. D. No. 24.....	\$1.40
Trolley B. D. No. 27.....	\$1.50
Trolley B. D. No. 28.....	\$1.60
Roller Bearings Nos. 39, 40.....	\$1.40
43, 44.....	70¢@5%
Anti-friction No. 42.....	60¢@10%
Hinged Tandem No. 48.....	60%
Folding Door B. B. Swivel No. 35.....	30%

Richards Mfg. Co.:	
Pioneer Wood Track No. 3.	\$2.15
Ball B'r'g St'l Track No. 10.	\$2.40
Roller B'r'g St'l Track No. 12.	\$2.30
Ball B'r'g St'l Track No. 13.	\$2.40

Wrought Iron Hinges— Strap and T Hinges, &c., list March 15, 1901:

Light Strap Hinges.....	80¢	5%
Heavy Strap Hinges.....	80¢	5%
Light T Hinges.....	75¢	5%
Heavy T Hinges.....	75¢	5%
Extra Heavy T Hinges.....	80¢	5%
Hinge Hasps.....	70¢	
Cor. Heavy Strap.....	80¢	5%
Cor. Ex. Heavy T.....	80¢	5%
Screw Hook { 6 to 12 in. lb. 3 1/2		
and Strap. { 1 1/2 to 20 in. lb. 3		
22 to 36 in. lb. 2 1/2		

Screw Hook and Eye:	
3/4 to 1 inch.....	lb. 6
1/2 inch.....	lb. 7
3/4 inch.....	lb. 9

Hitchers, Stall— Covert Mfg. Co., Stall Hitchers.....35%

Hods—Coal—	
Inch.....	15 16 17 18
Galv. Open.....	\$2.50 2.75 3.00 3.25
Jap. Open.....	\$1.90 2.10 2.25 2.55
Galv. Funnel.....	\$3.00 3.30 3.60 3.90
Jap. Funnel.....	\$2.45 2.65 2.85 3.30

Masons, Etc.—	
Cleveland Wire Spring Co.:	
Steel Mortar.....	each \$1.45
Steel Brick.....	each \$1.10

Hoes—Eye—	
Scorl and Oval Pattern.....	60¢ 10¢ 60¢ 10¢ 10%
Grub, list Feb. 23, 1899.....	70¢ 10¢ 75¢ 10%
D. & H. Scovill.....	35%

Handled— August 1, 1899, list.

Field and Garden.....	70¢ 10%
Smith's Patent.....	50%
Meadow & Rhode Island.....	75%
Black Diamond.....	70¢ 10%
Mortar and Street.....	70¢ 10%
Planters'.....	75¢ 12 1/2%
Cotton.....	70¢ 10%
Cotton Chopper.....	75¢ 12 1/2%
Weeding Hoes.....	66 2/3¢ 15%
Steel Weeders.....	66 2/3¢ 15%
Malleable Weeders.....	66 2/3¢ 15%
Ft. Madison Cotton Hoe.....	70¢ 10%
Ft. Madison Crescent Cultivator Hoe.....	70¢ 10%
Ft. Madison Mattock Hoe.....	70¢ 10%
Regular Weight.....	60¢ 60%
Junior Size.....	40¢ 40%
Ft. Madison Sprouting Hoe.....	\$2.20
rt. Madison Dixie Tobacco Hoe.....	75¢ 10%
Kretzinger's Cut Easy.....	75¢ 10%
Warren Hoe.....	75¢ 10%
W. & C. Ivahoe.....	75¢ 10%
R. B. 6 in. Cultivator Hoe.....	\$3.15
B. B. 6 in. in.....	\$3.35
Acme Weeding.....	per doz. net, \$4.35
W. & C. L'ning Shuffie Hoe.....	per doz. \$4.85

Hoisting Apparatus— See Machines, Hoisting.

Holders—Bit— Angular, 3 doz. \$24.00.....45¢ 10%

Door— Empire.....50%

File and Tool— Nicholson File Holders and File Handles.....33 1/3¢ 40%

Hooks—Cast Iron—

Bird Cage, Reading.....	60%
Bird Cage, Sargent's List.....	60¢ 10%
Ceiling, Sargent's List.....	50¢ 10%
Clothes Line, Reading List.....	60¢ 10%
Clothes Line, Sargent's List.....	50¢ 10%
Coat and Hat, Sargent's List.....	50¢ 10%
Clothes Line, Stowell's.....	70%
Coat and Hat, Reading.....	45¢ 20%
Coat and Hat, Stowell's.....	70%
Coat and Hat, Wrightsville.....	60%
Harness, Reading List.....	60%
Harness, Stowell's.....	60%
School House, Stowell's.....	70%

Wire—

Belt.....	80¢ 10¢ 10%
Wire C. & H. Hooks.....	75¢ 10¢ 75¢ 10¢ 65%
Atlas, Coat and Hat:	
Single Cases.....	75%
10 Case Lots.....	75¢ 10%
Columbian Hdw. Co., Gem.....	80¢ 10%
Parker Wire Goods Co., King.....	75¢ 10%
Van Wagoner, Coat and Hat.....	70%
Western W. G. Co., Molding.....	75%
Wire Goods Co.:	
Acme.....	60¢ 10%
Chief.....	70%
Crown.....	70¢ 10%
Czar.....	65%
V. Brace.....	70¢ 10%
Czar Harness.....	50¢ 10%

Wrought Iron—

Box, 6 in., per doz., \$1.00; 8 in.,	
\$1.25; 10 in., \$2.50.	
Cotton.....	doz. \$1.05¢ 10¢ 15
Wrought Staples, Hooks, &c.....	See Wrought Goods.

Miscellaneous—

Hooks, Bench, See Stops, Bench.	
Bush, Light, doz. \$1.75; Medium,	
\$5.35; Heavy, \$6.25	
Grass.....Nos. 1	
Best.....	\$1.30 1.75 2.60
Common.....	\$1.30 1.30 1.50 1.60
Potato and Manure.....	60¢ 15%
Whiffletree.....	lb. 5 1/2¢ 4
Hooks and Eyes:	
Brass.....	60¢ 10¢ 10¢ 70%
Malleable Iron.....	70¢ 5¢ 70¢ 10%
Covert Mfg. Co., Gate and Scuttle	
Hooks.....	35%
Covert Saddlery Works' Self Locking	
Gate and Door Hook.....	60%

Ft. Madison Cut-Easy Corn Hooks, 3 doz. \$3.25 net

Bench Hooks—See Bench Stops, Corn Hooks—See Knives, Corn.

Horse Nails— See Nails, Horse.

Horseshoes— See Shoes, Horse.

Hose, Rubber—	
Garden Hose, 3/4-inch:	
Competition.....	ft. 1 1/2¢ 5
3-ply Standard.....	ft. 6 1/2¢ 7
3-ply Standard.....	ft. 7 1/2¢ 8
3-ply extra.....	ft. 8 1/2¢ 9
3-ply extra.....	ft. 10 1/2¢ 10
Cotton Garden, 3/4-in., coupled:	
Low Grade.....	ft. 6 1/2¢ 7
Fair Quality.....	ft. 8 1/2¢ 9

Irons—Sad—

From 4 to 10.....	lb. 2 1/2¢ 3
B. B. Sad Irons.....	lb. 3 1/2¢ 4 1/2
Chinese Laundry.....	lb. 3 1/2¢ 5
Chinese Sad.....	lb. 4 1/2¢ 5
Mrs. Potts', cents per set:	
Nos.....	50 55 60 65
Jap'd Tops.....	62 59 72 69
Tin'd Tops.....	65 62 75 72
New England Pressing, lb. 3 1/2¢ 4 1/2	

Pinking—

Pinking Irons.....	doz. 50¢ 60¢
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Soldering—

Soldering Coppers, 2 1/2 & 3.20¢ 12 1/2	
1 1/2 & 2.....	22¢ 13 1/2

Jacks, Wagon—

Covert Mfg. Co.:	
Auto Screw.....	30¢ 5%
Steel.....	45¢ 2%
Covert's Saddlery Works:	
Daisy.....	60¢ 10%
Victor.....	60%
Lockport.....	50%
Lane's Steel.....	30¢ 10¢ 5%
Richards' Tiger Steel, No. 130.....	40%

Kettles—

Brass, Spun, Plain.....	20¢ 12 1/2%
Enameled and Cast Iron—See Ware, Hollow.	

Knives—

Butcher, Kitchen, &c.—

Foster Bros' Butcher, &c.....	30%
Smith & Hemenway Co.....	40¢ 10%
Wilkinson Shear & Cutlery Co.....	50%

Corn—

Withington Acme, 3 doz.....	\$2.65
Dent, 2 1/2 doz. Adj. Serrated.....	\$2.20
Serrated, 2 1/2 doz. Yankee No. 1.....	\$1.50
Yankee No. 2, 1 1/2 doz.....	\$1.15

Drawing—

Standard List.....	70¢ 10¢ 75¢ 10%
C. E. Jennings & Co., Nos. 45, 46, 60	
Jennings & Griffin, Nos. 41, 42.....	60%
Ohio Tool Co.'s.....	70%
Swan's.....	70¢ 10¢ 10%
Watrous.....	16%
L. & L. J. White.....	20¢ 5¢ 25%

Hay and Straw—

Serrated Edge.....	per doz. \$5.50
Ivan's Sickle Edge.....	30¢ 30
Ivan's Serrated.....	30¢ 30

Mincing—

Buffalo.....	30¢ 30
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Miscellaneous—

Farriers'.....	doz. \$3.00 3 1/2
Wostenholm's.....	30¢ 30

Knobs—

Base, 2 1/2-inch, Birch, or Maple,	
Rubber tip.....	gro. \$1.15¢ 1.20
Carriage, Jap., all sizes.....	
Door, Mineral.....	gro. 100¢ 45¢
Door, Por. Jap'd.....	doz. 65¢ 70¢
Door, Por. Nickel.....	doz. 70¢ 75¢
Barley's Wood Door, Shutters &c.....	15%
Picture, Sargent's.....	60¢ 10¢ 10%

Lacing, Leather— See Belting, Leather—

Ladders, Store, &c.—

Lane's Store.....	25%
Myers' Noiseless Store Ladders.....	50%
Richards Mfg. Co.:	
Improved Noiseless, No. 112.....	40%
Climax Shelf, No. 113.....	40%
Trolley, No. 109.....	40%

Ladies, Melting—

L. & G. Mfg. Co. (low list).....	25%
P. S. & W.....	50%
Reading.....	60%
Sargent's.....	50¢ 10%

Lanterns—Tubular—

Regular Tubular, No. 0.....	doz. \$4.35¢ 1.75
Lift Tubular, No. 0.....	doz. \$4.75¢ 1.25
Hinge Tubular, No. 0.....	doz. \$4.75¢ 1.25
Other Styles.....	40¢ 10¢ 10¢ 10¢ 5%

Bull's Eye Police—

No. 1, 2 1/2-inch.....	\$2.50¢ 2.75
No. 2, 3-inch.....	\$2.75¢ 3.00

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....	50%
Stowell's Badger, Cast Iron.....	50%

Latches—Thumb—

Roggin's Latches, with screw.....	doz. 35¢ 40¢
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Door—

Richards' Bull Dog, Heavy No. 125.....	40%
Richards' Trump, No. 12.....	50%

Leaders, Cattle—

Small.....	doz. 50¢; large, 60¢
Covert Mfg. Co.....	35%

Lifters, Transom—

R. & E.....	33 1/3%
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Lines—

Wire Clothes, Nos. 18 19 20	
100 feet.....	\$2.20 2.00 1.65
75 feet.....	\$1.80 1.70 1.30
Samson Cordage Works:	
Solid Braided Chalk, Nos. 0 to 3.....	40%
Silver Laid Braided Chalk, No. 0,	
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No.	
3, \$7.50.....	20%
Masons' Lines, Shade Cord, &c.:	
White Cotton, No. 3 1/2, \$1.50; No. 4,	
\$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2,	
\$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;	
Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;	
No. 4 1/2, \$4.50.....	20%
Tent and Awning Lines: No. 5,	
White Cotton, \$7.50; Drab Cotton,	
\$8.50.....	20%
Clothes Lines, White Cotton: 50 ft.,	
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75	
ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;	
100 ft., \$5.25.....	20%
Anniston Waterproof Clothes, 50 ft.,	
30 gro., \$24.00; 60 ft., \$22.00; 90 ft.,	
Line, \$22.00; Acme, \$17.00; Alabama,	
\$15.00; Empire, \$14.00; Advance,	
\$13.50; Oriole, \$20.00; Albemarle,	
\$13.50; Eclipse, \$12.50; Chicago,	
\$11.00; Standard, \$10.00; Columbia,	
\$8.50; Allston, \$12.50; Calhoun, \$11.00.	

Locks—Cabinet—

Cabinet Locks.....	\$3 1/2¢ 3 1/2¢ 4 1/2¢ 5 1/2%
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Door Locks, Latches, &c.—

NOTE—Net Prices are very often made on these goods.	
Reading Hardware Co.....	45¢ 20%
R. & E. Mfg. Co.....	40%
Sargent & Co.....	40¢ 10%
Stowell's Steel Door Latches.....	50%

Elevator—

Stowell's.....	50%
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Padlocks—

Wrought Iron.....	75¢ 10¢ 5¢ 80¢ 5%
R. & E. Mfg. Co. Wrought Steel and	
Brass.....	75¢ 75¢ 10%

Sash, &c.—

Ives' Patent:	
Bronze and Brass.....	62 1/2%
Crescent.....	50¢ 10%
Iron.....	62 1/2%
Window Ventilating.....	60%
Robison Patent Ventilating Sash	
Lock.....	40%
Wrought Bronze and Brass.....	55%
Wrought Steel.....	55%
Pullman Patent Ventilating Lock.....	25%
Reading.....	60%

Machines—Boring—

Com. Up'r, without Augers.....	\$2.00
Com. Ang'r, without Augers.....	\$2.25

Without Augers

R. & E. Mfg. Co., Upright, Angular,	
Improved No. 3, \$1.25; No. 1, \$5.00;	
Improved No. 4, 3.75; No. 2, 3.38	
Improved No. 5, 2.75	
Jennings', Nos. 1 and 4.....	35¢ 45%
Millers' Falls.....	5.75
Snell's, Rice's Pat. 2.50	2.75

Corking—

Reisinger Invincible Hand Power.....	30%
Pulley Block.....	30%
Moore's Hand Hoist, with Lock	
Brake.....	20%

Ice Cutting—

Chandler's.....	12 1/2%
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Washing—

Boss Washing Machine Co.:	
Champion Rotary Banner No. 1.....	\$54.00
Standard Champion No. 1.....	\$48.00
Standard Perfection.....	\$36.00
Cinti Square Western.....	\$30.00
Uneda American, Round.....	\$29.00

Mallets—

Hickory.....	45¢ 50¢ 50%
Lignumvitae.....	45¢ 50¢ 50%
Tinners' Hickory and Apple	
wood.....	doz. 50¢ 55%

Mangers, Stable—

Swift Iron Works.....	50%
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Mashers, Vegetable—

Western W. G. Co., Potato.....	60¢ 10%
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Mats, Door—

Elastic Steel (W. G. Co.).....	10%
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Mattocks— See Picks and Mattocks.

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.—

Enterprise Mfg. Co.....	25¢ 30%
National Jan. 1, 1902.....	

Tarred Paper—

1 ply (roll 300 sq. ft.), ton....	\$32.50@35.50
2 ply, roll 108 sq. ft.	55@60
3 ply, roll 108 sq. ft.	78@85
Slater's Felt (roll 50 sq. ft.)....	75
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....	\$2.75

Sand and Emery—

Flint Paper and Cloth.....	60@100
Garnet Paper and Cloth.....	25
Emery Paper and Cloth.....	50@100

Parers—Apple—

Advance.....	doz. \$4.00
Baldwin.....	doz. \$4.00
Bonanza Improved.....	each \$6.50
Daisy.....	doz. \$4.00
Dandy.....	each \$7.50
Eureka Improved.....	each \$20.00
Family Bay State.....	doz. \$15.00
Improved Bay State.....	doz. \$26.00
Little Star.....	doz. \$5.00
New Lightning.....	doz. \$7.00
Reading 72.....	doz. \$3.25
Reading 75.....	doz. \$6.25
Rocking Table.....	doz. \$6.25
Turn Table.....	doz. \$6.00
White Mountain.....	doz. \$5.00

Potato—

Saratoga.....	doz. \$7.00
White Mountain.....	doz. \$6.00

Picks and Mattocks—

List Feb. 23, 1899.....	70@100
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Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass.....	60@100
Iron, list Nov. 11, '85.....	60@100

Pipe, Cast Iron So—

Standard, 2-6 in.....	50@100
Extra Heavy, 2-6 in.....	65
Fittings.....	70

Pipe, Merchant—

Carload Lots.

	Steel.	Iron.
Blk. Galv. Blk. Galv.		
1/4 & 1/2 in.....	69 53 67 51	
3/4 & 1 in.....	73 61 71 59	
1 1/2 to 2 in.....	77 67 75 65	
2 1/2 to 4 in.....	72 57 70 55	

Pipe, Sewer—

Standard Pipe and Fittings, 2 to 24 in.....	67
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New England.....	67
New York and New Jersey.....	70
Maryland, Delaware, E. Pa.....	72
West. Pa. and West Va.....	75
Virginia.....	75
Ohio, Michigan and Ky.....	75
Indiana.....	77

NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:	
5 in., per 100 joints.....	\$5.00
6 in., per 100 joints.....	8.50
7 in., per 100 joints.....	9.50

Planes and Plane Irons—

Bench, First qual.....	40@100
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Bench, Second qual.....	50@100
Molding.....	33 1/2 @ 53 1/2 @ 10
Bailey's (Stanley R. & L. Co.).....	54@100

Chapin-Stephens Co.:	
Bench, First Quality.....	40@100
Bench, Second Quality.....	50@100
Molding.....	33 1/2 @ 53 1/2 @ 10
Toy and German.....	40@100
Chapin's.....	60

Ohio Tool Co.:	
Bench, First Quality.....	40@100
Bench, Second Quality.....	50@100
Molding.....	33 1/2 @ 53 1/2 @ 10
Adjustable Wood Bottom.....	60
Union.....	60

Iron Planes—

Bailey's (Stanley R. & L. Co.).....	54@100
Chapin's Iron Planes.....	50@100
Miscellaneous Planes (Stanley R. & L. Co.).....	20@100
Ohio Tool Co.'s Iron Planes.....	60
Sargent's.....	60@100
Union.....	60

Plane Irons—

Wood Bench Plane Irons.....	30@100
Buck Bros.....	30
Chapin-Stephens Co.....	30@100
Ohio Tool Co.....	30
Stanley R. & L. Co.....	20@100
Union.....	50
L. & J. White.....	30@100

Planters, Corn, Hand—

Kohler's Eclipse.....	doz. \$9.50
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Plates—

Fellow.....	lb. 3 1/4 @ 4
Self-Sealing Pie Plates (S. S. & Co.).....	doz. \$2.00

Pliers and Nippers—

Button Pliers.....	75@100
Gas Burner, per doz., 5 in., \$1.25 6 in., \$1.45 @ \$1.50.	
Gas Pipe.....	7 8 10 12 in.

Acme Nippers.....	50@100
Cronk & Carrier Mfg. Co.:	
American Button.....	75@100
Cronk's.....	60
Improved Button.....	60@100
Stub's Pattern.....	50
Combination and others.....	35
Heller's Farriers' Nippers.....	40@100
and Tools.....	40@100

P. S. & W. Tinnors' Cutting Nippers.....	30@100
Swedish Side, End and Diagonal Cutting Pliers.....	50
Utica Drop Forge & Tool Co.:	
Pliers and Nippers, all kinds.....	40

Plumbs and Levels—

Chapin-Stephens Co.:	
Plumbs and Levels.....	30@100
Chapin's Imp. Brass Cor. 10@40@100	
Pocket Levels.....	30@100
Diston's Plumbs and Levels.....	70
Diston's Pocket Levels.....	70
C. E. Jennings & Co.'s Iron.....	33 1/2
C. E. Jennings & Co.'s Iron, Adjustable.....	40@75
Stanley R. & L. Co. 30@100@100	
Stanley's Duplex.....	20@20@100
Woods' Extension.....	33 1/2

Poachers, Egg—

Buffalo Steam Egg Poachers, doz.	
No. 1, \$6.00; No. 2, \$9.00; No. 3, \$9.00; No. 4, \$12.00.....	50

Points, Glaziers—

Bulk and 1-lb. papers.....	lb. 8
1/4-lb. papers.....	lb. 8 1/4
1/2-lb. papers.....	lb. 9 1/4

Pokes, Animal—

Pt. Madison Hawk.....	doz. \$3.25
Pt. Madison Western.....	doz. \$4.00

Police Goods—

Manufacturers' Lists.....	25@25@5
Tower's.....	25

Polish—Metal—

Prestoline Liquid, No. 1 (1/2 qt.).....	doz. \$3.00
No. 2 (1 qt.).....	\$9.72
Prestoline Paste.....	40@100
George William Hoffman:	
U. S. Metal Polish Paste, 3 oz. boxes, doz. 50¢; doz. \$4.50;	
1/2 lb. boxes, doz. \$1.25; 1 lb. boxes, doz. \$2.25.....	
U. S. Liquid, 8 oz. cans, doz. \$1.25; doz. \$12.00.	
Barkeepers' Friend Metal Polish, doz. \$1.75; doz. \$18.00.	
Wynn's White Silk, 1/2 pt. cans, doz. \$2.00.....	

Stove—

Black Eagle Benzine Paste, 5 lb. cans, doz. \$10.00	
Black Eagle, Liquid, 1/2 pt. cans, doz. \$7.50	
Black Jack Paste, 1/2 lb. cans, doz. \$9.00	
Black Kid Paste, 5 lb. cans, each, \$0.65	
Ladd's Black Beauty, gr. \$10.00.....	
Joseph Dixon's, gr. \$5.75.....	
Dixon's Plumbago.....	gr. \$2.50
Fireside.....	gr. \$2.50
Gem, gr. \$4.50.....	10
Japanese.....	gr. \$3.50
Jef Black.....	gr. \$3.50
Peerless Iron Enamel, 10 lb. cans, doz. \$1.50	
Wynn's:	
Black Silk, 5 lb. pail.....	each 70¢
Black Silk, 1/2 lb. box.....	doz. \$1.00
Black Silk, 1/2 lb. box.....	doz. \$0.75
Black Silk, 1/2 pt. liq.....	doz. \$1.00

Poppers, Corn—

1 qt., Square.....	gro. \$9.00
1 qt., Round.....	gro. \$10.00
1 1/2 qt., Square.....	gro. \$11.00
2 qt., Square.....	gro. \$13.00

Post Hole and Tree Augers and Diggers—

See also Diggers, Post Hole, &c.

Posts, Steel—

Steel Fence Posts, each, 5 ft., 4 1/2; 6 ft., 4 1/2; 6 1/2 ft., 4 1/2.....	
Steel Hitching Posts.....	each \$1.30

Potato Parers—

See Parers, Potato.

Pots, Glue—

Enameled.....	40
Tinned.....	35

Powder—

In Canisters:	
Duck, 1 lb.....	each 45¢
Fine Sporting, 1 lb.....	each 75¢
Rifle, 1/2 lb.....	each 15¢
Rifle, 1 lb.....	each 25¢
King's Semi-Smokeless:	
Keq (25 lb bulk).....	\$6.50
Half Keq (12 1/2 lb bulk).....	\$3.50
Quarter Keq (6 1/4 lb bulk).....	\$2.00
Case 24 (1 lb cans bulk).....	\$3.50
Half case (1 lb cans bulk).....	\$4.50
King's Smokeless:	
Keq (25 lb bulk).....	\$12.00
Half Keq (12 1/2 lb bulk).....	6.25
Quarter Keq (6 1/4 lb bulk).....	3.25
Case 24 (1 lb cans bulk).....	14.00
Half case (1 lb c. bk.).....	7.25
Robin Hood Smokeless Shot Gun.....	50@20

Presses—

Enterprise Mfg. Co.....	20@25
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Seal Presses—

Morrill's No. 1, doz. \$20.00.....	50
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Pruning Hooks and Shears

See Shears.

Pullers, Cork—

Invincible Cork Puller.....	\$21.00
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Pullers, Nail—

Cyclops.....	50
Miller's Falls, No. 3, doz. \$12.00.....	33 1/2 @ 10
Morrill's No. 1, Nail Puller, doz. \$20.00.....	50
Pearson No. 1, Cyclone Spike Puller, each \$20.00.....	60@100
Pelican, doz. \$9.00.....	60@100
Scranton, Case Lots:	
No. 2B (large).....	\$5.50
No. 3B (small).....	\$5.00
Smith & Hemenway Co.:	
Diamond B. No. 2, case lots.....	doz. \$6.00
Diamond B. No. 3, case lots.....	doz. \$5.50
Giant No. 1, doz. \$18; No. 2, \$16.50; No. 3, \$15.....	40

Pulleys, Single Wheel—

Inch.....	2 2 1/4 3
Awning, doz.....	\$0.55 \$5 1.15
Hay Fork, Squirrel or Solid Eye, doz., 4 in., \$1.05; 5 in., \$1.35.....	
Inch.....	2 2 1/4 2 1/2
Hot House, doz.....	\$0.70 1.25
Inch.....	1 1/4 1 1/2 1 3/4
Screw, doz.....	\$0.16 .19 .23 .30
Inch.....	1 1/4 2 2 1/4 2 1/2
Side, doz.....	\$0.30 .40 .55 .63
Inch.....	1 1/4 1 1/2 2 1/2
Tackle, doz.....	\$0.30 .42 .58 1.00
Stowell's:	
Ceiling or End, Anti-Friction.....	60@100
Pump Water, Anti-Friction.....	60@100
Electric Light.....	60
Side, Anti-Friction.....	60@100

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1 1/2 and 2 in.....	16@19
Auger Mortise, No Face Plate, per doz, 1 1/2 and 2 in.....	16@19
Acme.....	1 1/2 in., 16¢; 2 in., 19¢
For All-Steel, Nos. 3 and 4, 2 in.....	doz. 50
Grand Rapids All Steel Noiseless.....	70@100
Ideal.....	1 1/2 in., 16¢; 2 in., 19¢
Niagara.....	1 1/2 in., 14¢; 2 in., 16¢
No. 25, Troy.....	1 1/2 in., 14¢; 2 in., 16¢
Star.....	1 1/2 in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.	

Pumps—

Cistern.....	60@100
Pitcher Spout.....	80@100
Wood Pumps, Tubing, &c.....	45@50
Barnes Dbl. Acting (low list).....	50@100
Barnes' Pitcher Spout.....	80
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....	\$16.00
Daisy Spray Pump.....	doz. \$7.20
Flint & Walling's, Fast Mail Hand (low list).....	55
Flint & Walling's Fast Mail (low list).....	55@55
Flint & Walling's Tight Top Pitcher.....	80
National Specialty Mfg. Co., Measur.....	30
Mechanical Sprayer.....	\$7.20
Myers' Pumps (low list).....	50
Myers' Power Pumps.....	50
Myers' Spray Pumps.....	50

Pump Leathers—

Plunger and Lower Valve—Per gro.....	
Inch.....	2 2 1/4 2 1/2 2 3/4
.....	\$2.20 2.50 2.75 3.00
Inch.....	3 3 1/4 3 1/2 3 3/4
.....	\$3.30 3.60 3.85 4.10
Plunger Cup Leathers—Per 100:	
Inch.....	2 1/2 3 3 1/4 4
.....	\$2.75 3.85 5.00 6.00

Punches—

Saddlers' or Drive, good.....	doz. 50@75
Spring, single tube, good quality.....	\$1.75@2.00
Revolving (1/4 tubes).....	doz. \$3.50@3.75
Bemis & Call Co.'s Cast Stl Drive.....	50
Bemis & Call Co.'s Check.....	50
Morrill's No. 1 (A.B.C.), doz. \$15.50.....	
No. 2, doz. \$22.50.....	50
Hercules, each \$7.50.....	50
Niagara Hollow Punches.....	40
Niagara Solid Punches.....	50@100
Steel Screw.....	1 1/2 in., \$2.00
Tinnors' Hollow, P. S. & W. Co.....	35@55
Tinnors' Solid, P. S. & W. Co.....	doz. \$4.40

Rail—Barn Door, &c.—

Cast Iron Barn Door; Flange Screw Holes for Rd. Groove Wheels:	
1/2.....	\$1.70
3/4.....	\$2.10
1 in.....	\$3.00

Angular for Sq. Groove Wheels:

Small, Med. Large.....	
1/2.....	\$1.50
3/4.....	\$1.90
1 in.....	\$2.60

Sliding Door, Iron Painted.....

1 1/2 in., lb., 36¢.....	30
Allth Mfg. Co.:	
No. 1, Reliable Hgr. Track, ft. 5 1/2.....	50
No. 2, Reliable Hgr. Track, ft. 7.....	70

Cronk's:

Double Braced Steel Rail.....	ft. 3¢
O. N. T. Rail.....	2¢

Griffin's:	
xxx, 100 ft., 1 x 3-16 in., \$3.00;	
1 1/4 x 3-16 in., 3.50.	
Hinged Hanger, 100 ft., 1 x 3-16 in., \$3.10; 1 1/4 x 3-16 in., \$3.60.	

Lane's:	
Hinged Track, 100 ft., 1 in., \$3.70;	
1 1/4 in., \$4.40.	
O. N. T., 100 ft., 1 in., \$2.75; 1 1/4 in., \$3.50; 1 1/2 in., \$4.00.	

Lawrence Bros.:	
100 ft. No. 201, \$4.00; No. 202, \$4.40.	
New York, 1 x 3-16 in., 100 ft. \$2.75	

Hinged Hanger Rail, 30 ft., 11¢.....	50
None Better.....	30 ft. 3%
Standard.....	30 ft. 4
Myers' Stayon Track.....	30

Sisal, Tarred, Medium Lath Yarn:
 Mixed lb., 8 c
 Pure lb., 9 1/2 c
Cotton Rope:
 Best, 1/4-in. and larger 16 1/2 c
 Medium, 1/4-in. and larger 14 1/2 c
 Common, 1/4-in. and larger 10 1/2 c
Jute Rope:
 Thread No. 1, 1/4-in. and up, 1b. 7 1/2 c
 Thread No. 2, 1/4-in. and up, 1b. 7 1/2 c
 Old Colony Manila Transmission Rope lb 17 1/2 c

Wire Rope—

Galvanized 47 1/2 c
 Plain 55 1/2 c

Ropes, Hammocks—

Covert Mfg. Co.: 50 1/2 c
 Jute 50 1/2 c
 Sisal 50 1/2 c
 Covert Saddlery Works 60 1/2 c

Rules—

Boxwood 60 1/2 c
 Ivory 35 1/2 c
 Chapin-Stephens Co.: 60 1/2 c
 Boxwood 60 1/2 c
 Ivory 35 1/2 c
 Miscellaneous 50 1/2 c
 Combination 55 1/2 c
 Stationers 10 1/2 c

Kenell & Esler Co.: 35 1/2 c
 Folding, Wood 33 1/2 c
 Lufkin's Steel 50 1/2 c
 Lufkin's Lumber 70 c
 Stanley R. & L. Co.: 60 1/2 c
 Boxwood 35 1/2 c
 Ivory 35 1/2 c
 Union Nut Co.: 60 1/2 c
 Boxwood 35 1/2 c
 Ivory 35 1/2 c

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Saws—**

Atkins': 50 c
 Circular 50 c
 Band 50 c
 Cross Cut 50 c
 Mulay, Mill and Drag 50 c
 One-Man Saw 40 c
 Wood Saws 40 c
 Hand, Compass, &c. 40 c
 Chapin-Stephens Co.: 30 c
 Turning Saws and Frames, 30 c
 Diamond Saw & Stamping Works 30 c
 Sterling Kitchen Saws 30 c
 Disston's: 50 c
 Circular, Solid and Ins'ted Tooth, 50 c
 Band, 2 to 14 in. wide, 50 c
 Band, 1/4 to 1 in. wide, 50 c
 Crosscuts 50 c
 Narrow Crosscuts 50 c
 Mulay, Mill and Drag 50 c
 Framed Woodsaws 30 c
 Wood saw Blades 30 c
 Hand Saws, Nos. 12, 90, 9, 16, 1100, 120, 76, 77, 8 2 c
 Hand Saws, Nos. 7, 107, 107 1/2, 3, 1, 9, 0, Combination 30 c
 Compass, Key Hole, &c. 30 c
 Butcher Saws and Blades 30 c
 C. E. Jennings & Co.'s: 25 c
 Back Saws 30 c
 Butcher Saws 30 c
 Compass and Key Hole Saws 35 c
 Framed Wood Saws 30 c
 Hand Saws 30 c
 Wood Saw Blades 30 c
 Millers Falls: 15 1/2 c
 Butcher Saws 15 1/2 c
 Star Saw Blades 15 1/2 c
 Peace & Richardson's Hand Saws 30 c
 Simonds': 50 c
 Circular Saws 50 c
 Crescent Ground Cross Cut Saws 35 c
 One-Man Cross Cuts 40 c
 Gang Mill, Mulay and Drag Saws 50 c
 Band Saws 30 c
 Back Saws 30 c
 Butcher Saws 30 c
 Hand Saws 30 c
 Hand Saws, Bay State Brand 45 c
 Compass, Key Hole, &c. 30 c
 Wood Saws 30 c
 Springfield Mach. Screw Co.: 40 c
 Diamond Kitchen Saws 40 c
 Butcher Saws 30 c
 Wheeler, Madden & Clemons Mfg. Co.'s Cross Cut Saws 50 c

Hack Saws—

Atkins' Hack Saw Blades A A A 25 c
 Disston's: 25 c
 Concave Blades 25 c
 Keystone 40 c
 Hack Saw Frames 30 c
 Fitchburg File Works, The Best 25 c
 C. E. Jennings & Co.'s: 40 c
 Hack Saw Frames, Nos. 175, 180, complete 40 c
 Hack Saws, Nos. 175, 180, complete 40 c
 Goodell's Hack Saw Blades 35 c
 Griffin's Hack Saw Blades 35 c
 Springfield Mach. Screw Co.: 35 c
 Diamond Hack Saw Blades 35 c
 Star Hack Saws and Blades 35 c
 Sterling Hack Saw Blades 35 c
 Sterling Hack Saw Frames 30 c

Scroll—

Barnes' No. 7, 115 25 c
 Barnes' Scroll Saw Blades 40 c
 Barnes' Velocipede Power Scroll Saw without boring attachment, 115 25 c
 with boring attachment, 115 25 c
 Lester, complete, 110 15 1/2 c
 Rogers, complete, 110 15 1/2 c

Scalers, Fish—

Covert's Saddlery Works 60 1/2 c

Scales—

Family, Turnbull's 50 c

Counter:

Hatch, Platform, 1/2 oz. to 4 lbs. 50 c

Two Platforms, 1/2 oz. to 8 lbs. 16 00

Union Platform, Plain, 1.70 c

Union Platform, Stpd., 1.85 c

Chatillon's: 25 c

Eureka 40 c

Favorite 40 c

Chicago Scale Co.: 50 c

The "Little Detective" 50 c

Union or Family No. 2 50 c

Portable Platform (reduced list) 50 c

Wagon or Stock (reduced list) 50 c

"The Standard" Portables 50 c

"The Standard" R. R. and Wagon 50 c

Scrapers—

Box, 1 Handle 22 00

Box, 2 Handle 22 00

Ship, Light, 2.00; Heavy, 4.50

Adjustable Box Scraper (S. R. & L.) 30 c

Chapin-Stephens Co. Box 50 c

Screens, Window and Frames—

Flyer Pattern Screens 60 c

Maine Screen Frames 10 1/2 c

Perfection Screens 60 c

Phillips' Screen Frames 60 c

See also Doors.

Screws—Bench and Hand

Bench, Iron, doz., 1 in. 25 00

2 1/2; 1 1/4, 3.00 c; 1 1/2, 3.50 c

Bench, W'd. Beech, doz. 30 c

Hand, Wood 30 c

R. Bliss Mfg. Co. Hand 30 c

Chapin-Stephens Co. Hand 30 c

Ohio Tool Co. Bench and Hand 30 c

Coach, Lag and Hand Rail-Lag, Common Point, list Oct. 1, '99 80 c

Coach and Lag, Gimlet Point, list Oct. 1, '99 75 c

Hand Rail, list Jan. 1, '01 70 c

Jack Screws—

Standard List 75 c

Millers Falls 50 c

P. S. & W. 50 c

Sargent 70 c

Swett Iron Works 75 c

Machine—

List Jan. 1, '98:

Flat or Round Head, Iron 50 c

Flat or Round Head, Brass 50 c

Set and Cap—

Set (Iron or Steel) 80 c

Sq. Hd. Cap 75 c

Hx. Hd. Cap 75 c

Rd. or Fulliter Hd. Cap 65 c

Wood—

List July 23, 1903.

Manufacturers' printed discounts:

Flat Head, Iron 87 1/2 c

Round Head, Iron 85 c

Flat Head, Brass 85 c

Round Head, Brass 85 c

Flat Head, Bronze 77 1/2 c

Round Head, Bronze 75 c

Drive Screws 87 1/2 c

Scroll Saws—

See Saws, Scroll.

Scythes—

Prices announced for next season:

Clipper Pattern Grass 50 c

Full Polished, Clipper 50 c

Grain 50 c

Clipper, Grain 50 c

Weed and Bush 50 c

Seeders, Raisin—

Enterprise 25 c

Sets—Awl and Tool—

Brad Axl and Tool Sets:

Wood Handle, 10 Axl. 25 c

Wood Handle, 14 Axl. 25 c

Tools 25 c

Aiken's Sets, Awl and Tools: 50 c

No. 20, 1/2 doz. 10.00 50 c

Pray's Adj. Tool Handles, Nos. 1, 12; 2, 118; 3, 12; 4, 9; 5, 7 50 c

C. E. Jennings & Co.'s Model Tool Holders 30 c

Millers Falls Adj. Tool Handles, No. 1, 12; No. 4, 12; No. 5, 118 15 1/2 c

Stanley's Excelsior: 50 c

No. 1, 7.00; No. 2, 4.00; No. 3, 3.50 30 c

Garden Tool Sets—

Pt. Madison Three Plows, Hoe, Rake and Shovel 50 c

Nail—

Square 25 c

Round, Btk. and Pol., assorted 25 c

Octagon 25 c

Buck Bros. 25 c

Cannon's Diamond Point, 1/2 doz. 12.25 25 c

Snell's Cannon's Diamond Point, 1/2 doz. 12.25 25 c

Snell's Corrugated, Cup Pt. 25 c

Snell's Knurled, Cup Pt. 25 c

Springfield Mach. Screw Co.: 25 c

Diamond Knurled Cup Pt. 1/2 doz. 12.25 25 c

Regular list 75 c

Saw—

Aiken's: 50 c

Genuine 50 c

Imitation 50 c

Atkin's: 40 c
 Criterion 40 c
 Adjustable 40 c
 Bemis & Call Co.'s: 30 c
 Cross Cut 30 c
 Plate 20 c
 Diastion's Star and Monarch 25 c
 Morrill's No. 1, 15.00 50 c
 Nos. 3 and 4, Cross Cut, 23.55 50 c
 No. 6, Mill, 30.00 50 c
 No. 10, 11, 12, 13.68 50 c
 No. 1 Old Style, 10.00 50 c
 Special, 16.25 50 c
 Giant Royal, Cross Cut 50 c
 Royal, Hand 50 c
 Taintor Positive 50 c

Shaving—

Fox Shaving Sets, No. 30 25 c
 Fox Shaving Sets, No. 30, net, 23.00

Sharpeners, Knife—

Chicago Wheel & Mfg. Co. 65 c

Shaves, Spoke—

Iron 1.00 c

Wood 1.75 c

Bailey's (Stanley R. & L. Co.) 30 c

Chapin-Stephens Co. 30 c

Goodell's 1/2 doz. 30.00 15 1/2 c

Wood's Fl and F2 50 c

Shears—

Best 15.00

Good 15.00

Cheap 6.00

Straight Trimmers, &c.: 7.00

Best quality, Jap. 70 c

Best quality, Nickel 60 c

Fair quality, Jap. 80 c

Fair quality, Nickel 75 c

Tailors' Shears 40 c

Acme Cast Shears 40 c

Heinrich's Tailor's Shears 40 c

Wilkinson's Heels, 1900 list 45 c

Wilkinson's Branch, Lawn & Border, 40 c

Wilkinson's Sheep, 1900 list 50 c

Tinners' Snips—

Steel Blades 20 c

Steel Laid Blades 40 c

Forged Handles, Steel Blades, Berlin, 40 c

Heinrich's Snips 40 c

Jennings & Griffin Mfg. Co.'s 6 1/2 to 10 in. 50 c

Niagara Snips 40 c

P. S. & W. Co. 20 c

Pruning Shears and Tools

Cronk's Grape Shears 33 1/2 c

Cronk's Pruning Shears 33 1/2 c

Disston's Combined Pruning Hook and Saw, 1/2 doz. 18.00 25 c

John T. Henry Mfg. Co.: 25 c

Pruning Shears, all grades, 40 c

Range Shears 50 c

Grape Shears 40 c

Tree Pruners 75 c

P. S. & W. Co. 33 1/2 c

Sheaves—Sliding Door—

Stowell's Anti-Friction 50 c

Patent Roller, Hatfield's, Sargent's list 70 c

Reading 60 c

R. & E. list 33 1/2 c

Wrightsville Hatfield Pattern 80 c

Sliding Shutter—

Reading list 45 c

R. & E. list 33 1/2 c

Sargent's list 50 c

Shells—Shells, Empty—

Brass Shells, Empty:

First quality, all gauges 60 c

Club, Rival, 10 and 12 gauge 60 c

Paper Shells, Empty:

Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge, 25 c

Blue Rival, New Climax, Challenge, Monarch, Defence, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge, 20 c

Climax, Union, League, New Rival, 10 and 12 gauge 25 c

Climax, Union, League, New Rival, 14, 16 and 20 gauge (47.50 list) 20 c

Export, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge 35 c

Robin Hood, Low Brass 20 c

Robin Hood, High Brass 30 c

Shells, Loaded—

Loaded with Black Powder 40 c

Loaded with Smokeless Powder, medium grade 40 c

Loaded with Smokeless Powder, high grade 40 c

Robin Hood Smokeless Powder: 50 c

Robin Hood, Low Brass 20 c

Comets, High Brass 50 c

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:

Iron per keg \$4.00

Steel per keg \$3.75

Burden's, all sizes per keg \$3.90

Shot—

Pike Mfg. Co., 1901 list:	
Black Diamond S. S. 1/2 gro.	\$12.00
Lamouille S. S. 1/2 gro.	\$11.00
White Mountain S. S. 1/2 gro.	\$8.00
Green Mountain S. S. 1/2 gro.	\$6.00
Extra Indian Pond S. S. 1/2 gro.	\$7.50
No. 1 Indian Pond S. S. 1/2 gro.	\$7.00
No. 2 Indian Pond S. S. 1/2 gro.	\$4.50
Leader Red End S. S. 1/2 gro.	\$4.50
Emery and Corundum 10 gro.	\$3.00
Pure Corundum 10 in. 1/2 gro.	\$12.00
Crescent 1/2 gro.	\$7.00
Emery Scythe Rifles, 2 Coat	\$8.00
Emery Scythe Rifles, 3 Coat	\$10.00
Emery Scythe Rifles, 4 Coat	\$12.00
Balance of 1901 list 3 1/2%	

Oil Stones, &c.—

Chicago Wheel & Mfg. Co., 1901 list:	
Gem Corundum Oil, Double Grit. 50%	
Gem Corundum Oil, Single or Double Grit. 50%	
Gem Corundum Oil, Razor Hones. 50%	
Pike Mfg. Co., 1901 list:	
Arkansas St. No. 1, 3 to 5 in. 1/2 doz.	\$2.50
Arkansas St. No. 1, 5 1/2 to 8 in. 1/2 doz.	\$3.50
Arkansas Slips No. 1. 1/2 doz.	\$4.00
Lily White Washita, 4 to 8 in. 1/2 doz.	\$6.00
Rosy Red Washita, 4 to 8 in. 1/2 doz.	\$6.00
Washita St., Extra, 4 to 8 in. 1/2 doz.	\$5.00
Washita St., No. 1, 4 to 8 in. 1/2 doz.	\$4.00
Washita St., No. 2, 4 to 8 in. 1/2 doz.	\$4.00
Lily White Slips. 1/2 doz.	\$9.00
Rosy Red Slips. 1/2 doz.	\$9.00
Washita Slips, Extra. 1/2 doz.	\$8.00
Washita Slips, No. 1. 1/2 doz.	\$7.00
Washita Slips, No. 2. 1/2 doz.	\$7.00
India Oil Stones (entire list). 3 1/2%	
Quickcut Emery and Corundum Oil Stone, Double Grit. 3 1/2%	
Quickcut Emery and Corundum Oil Stone, Double Grit. 3 1/2%	
Quickcut Emery Rubbing Bricks. 3 1/2%	
Hindustan No. 1, R. G. Jar. 1/2 doz.	\$8.00
Hindustan No. 1, Small. 1/2 doz.	\$10.00
Axe Stones (all kinds). 1/2 doz.	\$10.00
Turkey Oil Stones, Extra, 5 to 8 in. 1/2 doz.	\$8.00
Queer Creek Stones, 4 to 8 in. 1/2 doz.	\$8.00
Queer Creek Slips. 1/2 doz.	\$2.50
Sand Stone. 1/2 doz.	\$2.50
Belgian, German and Swaty Razor Hones. 50%	
Natural Grit Carving Knife Hones. 1/2 doz.	\$3.00
Quick Edge Pocket Knife Hones. 1/2 doz.	\$2.50
Mounted Kitchen Sand Stone. 1/2 doz.	\$1.50

Stoners, Cherry—

Enterprise 1/2 doz.	\$3.00
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Stoppers, Bottle—

Victor Bottle Stoppers. 1/2 doz.	\$3.00
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Stops—Bench—

Morris's, 1/2 doz.	\$15.00
Morris's, No. 2, 1/2 doz.	\$10.00
Morris's, No. 2, 1/2 doz.	\$10.00

Door—

Chapin-Stephens Co. 1/2 doz.	\$10.00
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Plane—

Chapin-Stephens Co. 1/2 doz.	\$20.00
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Straps—Box—

Cary's Universal, case lots. 20 & 10 & 10%	
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Hame—

Corvert's Saddlery Works. 1/2 doz.	\$10.00
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Stretchers, Carpet—

Cast Iron, 8 1/2 Points. doz.	\$5.00
Socket 1/2 doz.	\$1.75
Excelsior Stretcher and Tack Hammer Combined. 1/2 doz.	\$6.00

Stuffers, Sausage—

Enterprise Mfg. Co. 1/2 doz.	\$3.00
National Specialty Co., list Jan. 1, 1902 30 & 5%	

Sweepers, Carpet—

National Sweeper Co. 1/2 doz.	\$4.00
Auditorium, Roller Bearing (26 in. case), Nickel. 1/2 doz.	\$54.00
Mammoth, Roller Bearing (30 in. case), Nickel. 1/2 doz.	\$60.00
Marion, Roller Bearing, regular finishes, full Nickel. 1/2 doz.	\$24.00
Marion Queen, Roller Bearing, full Nickel. 1/2 doz.	\$24.00
Monarch, Roller Bearing, N. kel. 1/2 doz.	\$22.00
Monarch, Roller B'g, Jap' nel. 1/2 doz.	\$22.00
Transparent, Roller Bearing, Plate Glass Top, Nickel. 1/2 doz.	\$36.00
Monarch Extra, Roller Bearing, (17-in. case), Nickel. 1/2 doz.	\$36.00
Monarch Extra, Roller Bearing (17-in. case), Japanned. 1/2 doz.	\$33.00
National Queen, Roller Bearing. 1/2 doz.	\$27.00
Perpetual, Regular B'g's, Nkl. 1/2 doz.	\$30.00
Perpetual, Regular B'g's, Jap. 1/2 doz.	\$30.00

NOTE.—Rebates: 50¢ per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$3.50 per dozen on twenty-five-dozen lots

Tacks, Brads, &c.—

Carpet Tacks. 1/2 doz.	\$3.00
American Cut Tacks. 1/2 doz.	\$3.00
Suedes Cut Tacks. 1/2 doz.	\$3.00
Suedes Upholsterers' Tacks. 1/2 doz.	\$3.00
Gimp Tacks. 1/2 doz.	\$3.00
Lace Tacks. 1/2 doz.	\$3.00
Trimmers' Tacks. 1/2 doz.	\$3.00
Looking Glass Tacks. 1/2 doz.	\$3.00
Bill Posters' and Railroad Tacks. 1/2 doz.	\$3.00
Hungarian Nails. 1/2 doz.	\$3.00
Common and Patent Brads. 1/2 doz.	\$3.00
Trunk and Clout Nails. 1/2 doz.	\$3.00

NOTE.—The above prices are for Straight Wrights. An extra 5¢ is given on Star Wrights, and an extra 10¢ on Standard Wrights.

Miscellaneous—

Double Pointed Tacks. 1/2 doz.	\$3.00
Steel Wire Brads, R. & E. Mfg. Co. list 50 & 10 & 60%	
See also Nails, Wire.	

Tanks, Oil—

Each.	
Emerald, S. S. & Co. 30-gal.	\$3.40
Emerald, S. S. & Co. 60-gal.	\$4.25
Queen City, S. S. & Co. 30-gal.	\$3.65
Queen City, S. S. & Co. 60-gal.	\$4.50

Tapes, Measuring—

American Ases' Skin. 40 & 10 & 50%	
Patent Leather. 25 & 30 & 5%	
Steel. 40 & 10 & 50%	
Chesterman's. 25 & 30 & 5%	
Eddy Ases' Skin. 40 & 10 & 50%	
Eddy Patent Leather. 25 & 30 & 5%	
Eddy Steel. 40 & 10 & 50%	
Keuffel & Esser Co. 40 & 10 & 50%	
Favorite, Ass Skin. 40 & 10 & 50%	
Favorite, Duck and Leather. 25 & 30 & 5%	
Metallic and Steel, lower list.	
Pocket. 35 & 35 & 5%	
Lufkin's Steel. 35 & 35 & 5%	
Lufkin's Metallic. 35 & 35 & 5%	

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 5/8-inch and larger. per 100 lbs.	\$3.00
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Thermometers—

Tin Case. 80 & 10 & 80 & 10 & 5%	
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Ties, Dale—Steel Wire

Single Loop. 80 & 8%	
Monitor, Cross Head, &c. 70%	

Brick Tiles—

Niagara Brick Tiles. 25 & 10%	
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Tinners' Shears, &c.—

See Shears, Tinners', &c.	
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Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.	
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Tips, Safety Pole—

Corvert's Saddlery Works. 60 & 10%	
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Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.	
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Tools—Coopers'—

L. & I. J. White. 20 & 20 & 5%	
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Hay—

Myers' Hay Tools. 50%	
Stowell's Hay Carriers. 50%	
Stowell's Hay Forks. 50%	
Stowell's Fork Pulleys. 50%	

Saw—

Atkins' Cross Cut Saw Tools. 40%	
Simonds' Improved. 33 1/2%	
Simonds' Crescent. 25%	

Ship—

L. & I. J. White. 25%	
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Transom Lifters—

See Lifters, Transom.	
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Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15 & \$1.25; gro. \$11.50 & \$12.00	
Harper, Champion or Paragon, doz. \$1.25 & \$1.40; gro. \$13.00 & \$13.50	

Game—

Onida Pattern. 75 & 10 & 75 & 10 & 5%	
New York Pattern. 40 & 5 & 40 & 5%	
Hawley & Norton. 70 & 10 & 70 & 10 & 5%	
Victor and Onida. 70 & 10 & 70 & 10 & 5%	
O. C. Jump (Blake Pat.). 60 & 5 & 60 & 5%	

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8 1/2 & 9 1/2	
Mouse, Round or Square Wire, doz. 8 1/2 & 9 1/2	
Marty French Rat and Mouse Traps (Genuine): No. 1, Rat, each \$1.21; 1/2 doz. \$13.25	
No. 3, Rat, 1/2 doz. \$6.50; case of 50 \$75.00	
No. 3 1/2, Rat, 1/2 doz. \$5.25; case of 72 \$72.00	
No. 4, Mouse, 1/2 doz. \$3.85; case of 150 \$30.00	
No. 5, Mouse, 1/2 doz. \$3.00; case of 150 \$22.50	

Trimmers, Spoke—

Wood's E. I. 50%	
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Trowels—

Diastion Brick and Pointing. 30%	
Diastion Plastering. 25%	
Diastion "Standard Brand" and Gardner Trowels. 35%	
Kohler's Steel Garden Trowels, 5 in. 2 gro. \$4.80	
Kohler's Steel Garden Trowels, 6 in. 1 gro. \$6.00	
Never-Break Steel Garden Trowels. 1 gro. \$6.00	
Rose Brick and Plastering. 25%	
Woodrough & McParlin, Plastering. 25%	

Trucks, Warehouse, &c.—

B. & L. Block Co. 50 & 10%	
New York Pattern. 60 & 10%	
Handy Trucks. 1/2 doz. \$16.00	
Grocery 1/2 doz. \$15.00	
Daisy Stove Trucks, Improved Pattern. 1/2 doz. \$18.50	
McKinney Trucks. each \$10.00	
Model Stove Trucks. 1/2 doz. \$18.50	

Tubs, Wash—No. 1 & 2

Galvanized, per doz. \$1.75 5.25 6.00	
Galvanized Wash Tubs (S. S. & Co.): No. 1, 2 10 20 30	
Per doz., net. \$5.70 6.30 7.20 6.00 7.20 8.10	

Twine, Miscellaneous—

Flax Twine: B. C. B. No. 9, 1/4 and 1/2 lb. Balls. 22 & 24¢	
No. 12, 1/4 and 1/2 lb. Balls. 18 & 20¢	
No. 15, 1/4 and 1/2 lb. Balls. 16 & 18¢	
No. 21, 1/4 and 1/2 lb. Balls. 16 & 18¢	
No. 36, 1/4 and 1/2 lb. Balls. 15 & 17¢	
Chalk Line, Cotton 1/2 lb. 30¢	
Cotton Mops, 6, 9, 12 and 15 lb. to doz. 9 1/2 & 11 1/2	
Cotton Wrapping, 5 Balls to lb., according to quality. 13 1/2 & 20¢	
American 2-Ply Hemp, 1/4 and 1/2 lb. Balls. 13 & 14¢	
American 3-Ply Hemp, 1-lb. Balls. 13 & 14¢	

India 2-Ply Hemp, 1/4 and 1/2 lb. Balls (Spring Twine). 8¢	
India 3-Ply Hemp, 1-lb. Balls. 70 & 8¢	
India 3-Ply Hemp, 1 1/2 lb. Balls. 60 & 7¢	
2, 3, 4 and 5-Ply Jute, 1/2 lb. Balls. 9 & 10¢	
Mason Line, Linen, 1/2 lb. Bls. 4¢	
No. 26 1/2 Mattress, 1/4 and 1/2 lb. Balls. 37¢	
Wool, 3 to 6 ply. B 3 1/4 & 4 1/2	

Vises—

Solid Box. 50 & 10 & 60%	
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Parallel—

Athol Machine Co. 40%	
Simpson's Adjustable. 40%	
Amateur. 40%	
Columbian Hdw. Co. 40%	
Emmert Universal: Pattern Makers' No. 1, \$15.00; No. 2, \$12.50; No. 3, \$10.00.	
Machinist and Tool Makers' No. 4, \$12.50; No. 5, \$7.00; No. 6, \$10.00; No. 10, \$21.50.	
Jewelers' No. 7. \$4.00	
Fisher & Norris Double Screw. 15 & 10%	
Hollands: Keystone. 40 & 40 & 5%	
Lewis Tool Co. 20 & 30%	
Merrill's. 20%	
Millers Falls. 60 & 10%	
Massey Vise Co.: Perfect. 40%	
Lightning Grip. 20%	
Parker's: Victor. 20 & 25%	
Regulars. 20 & 25%	
Vulcan. 40 & 40 & 5%	
Combination Pipe. 55 & 60%	
Prentiss. 20 & 25%	
Sargent's. 40%	
Smith & Hemenway Co.: Machinists'. 40%	
Jewelers' X. L. 33 1/2%	
Stephens'. 33 1/2%	

Saw Filers—

Diastion's D 3 Clamp and Guide, 1/2 doz. \$30.	
Perfection Saw Clamps, 1/2 doz. \$5.00	
Reading. 60%	
Wentworth's Rubber Jaw, Nos. 1, and 3. 45 & 50%	

Wood Workers—

Massey Vise Co.: Lightning Grip. 15%	
Perfect. 15%	
Wyman & Gordon's Quick Action, 6 in. \$6.00; 9 in. \$7.00; 14 in. \$8.00.	

Miscellaneous—

Signall & Keeler Combination Pipe Vise. 60 & 10%	
Holland's Combination Pipe. 60 & 10%	
Massey's Quick Action Pipe. 40%	
Parker's Combination Pipe: 87 Series. 60%	
187 Series. 60 & 5%	
No. 870. 40%	

Wads—Price per M.

B. E., 11 up. 60¢	
B. E., 9 and 10. 70¢	
B. E., 8. 80¢	
B. E., 7. 80¢	
P. E., 11 up. \$1.00	
P. E., 9 and 10. 1.25	
P. E., 8. 1.50	
P. E., 7. 1.50	
Ely's B. E., 11 and larger. \$1.70 & \$1.75	
Ely's P. E., 12 to 20. \$3.00 & \$3.25	

Ware, Hollow—

Cast Iron, Hollow—	
Stove Hollow Ware:	
Enameled. 55 & 10 & 60%	
Ground. 60 & 10 & 65%	
Plain or Unground. 65 & 10 & 70%	
Country Hollow Ware, per 100 lbs. \$2.50	
White Enameled Ware:	
Mastin Kettles. 70%	
Covered Ware:	
Tinned and Turned. 40%	
Enameled. 50%	
See also Pots, Glue.	

Enameled—

Agate Nickel Steel Ware. 50 & 20%	
Agate Nickel Steel Ware, Specials. 60%	
Iron Clad Ware. 60 & 15%	
Lava, Enameled. 40 & 10%	
Never Break Enameled. 50%	

Tea Kettles—

Galvanized Tea Kettles:	
1/2 doz. 6 7 8 9	
Each. 15¢ 50¢ 55¢ 63¢	

Steel Hollow Ware—

Avery Spiders and Griddles. 65 & 5 & 5%	
Avery Kettles. 60%	
Porcelain. 50 & 5 & 10%	
Never Break Spiders and Griddles. 65 & 5%	
Never Break Kettles. 60%	
Solid Steel Spiders and Griddles. 65 & 5%	
Solid Steel Kettles. 60%	

Warmers, Foot—

Pike Mfg. Co., Soapstone. 40 & 40 & 10%	
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